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The Ovulatory Shift: Proceptive and Receptive Mating Behaviours Across the Menstrual Cycle

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Dissertation Submitted in partial fulfilment of the requirements of the degree of

Ph.D., Clinical Psychology

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June 30th, 2015

Lakehead UNIVERSITY

FACULTY OF GRADUATE STUDIES

NAME OF STUDENT: Maggie Phillips

DEGREE AWARDED: Ph.D.

ACADEMIC UNIT: Psychology

TITLE OF DISSERTATION: The Ovulatory Shift: Proceptive and Receptive Mating Behaviours Across the Menstrual Cycle.

This dissertation has been prepared

under my supervision

and the candidate has complied

with the Doctoral regulations.

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Abstract

Research has suggested an ovulatory shift whereby women become more oriented towards short-term mating around the time of ovulation. Other research suggests that women's cyclical shifts depend on their sociosexuality and that sociosexuality may only be related to proceptive (but not receptive) behaviours. Study 1 (n = 64) provided reliability and validity information on an independent measure of short-term mating orientation and examined women's use of proceptive and receptive mating strategies with a new measure (the Proceptive and Receptive Mating Strategies Scale; PARMSS). Reliability and validity indicators provided strong support for use of both measures. Study 2 (n = 28) was a prospective pseudo-randomized counterbalanced controlled crossover design where women rated their likelihood of engaging in proceptive and receptive mating behaviours with imaginary men and 19 specific attractive men (seen in photos) at the periovulatory and luteal phases of their menstrual cycles. It was predicted that women overall would show an increase in receptive mating behaviours near ovulation (Hypothesis 1), but that sociosexuality would interact with menstrual cycle phase to predict proceptive behaviours (i.e., restricted women will become more proceptive at ovulation but unrestricted women will become less proceptive) (Hypothesis 2). It was predicted that differential shifts in self-perceived attractiveness may be a mechanism facilitating the ovulatory shift (Hypothesis 3). Hypotheses 1 and 2 (but not 3) were supported when women evaluated men of high social visibility and the effects were most pronounced in a subsample of exclusively heterosexual women. This dissertation provides rationale and preliminary support for the reliability and validity of the PARMSS and provides further evidence that women's sociosexuality is associated with differential shifts in proceptive mating behaviour across the menstrual cycle.

Acknowledgements

To my supervisor, Dr. Kirsten Oinonen, whose easy nature and excitement in the conceptual possibilities kept the project relevant, interesting, and fun to think about. Thank you for your continual support and the many, many hours you spent reviewing and discussing this project with me.

To the many peers who have been there to commiserate in the struggles and celebrate in the accomplishments that is graduate school. The many connections I have made throughout these years have been formidable and although we always knew we would be eventually heading in our different directions, the friendships we have made will be with me forever.

To my parents, whose support over the years has been immeasurable. The months and months of Saturday sleepovers with City Grandma and Grandpa made writing this dissertation possible. Thank you both for your encouragement, support, and love, and for Friday night pizza.

Finally, to my best friend Jeff. Thank you for all that you do to keep our family rolling. You make lunches while I am still in bed, water my tomatoes when I have neglected them, and make snowboarding trips a reality. This has already been an incredible journey and I am so thankful to have had you to hold onto throughout.

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The ovulatory shift hypothesis (e.g., Gangestad & Thornhill, 1998; Gangestad, Thornhill, & Garver-Apgar, 2005) suggests that women's mate preferences and behaviours shift according to menstrual cycle phase. In general, studies have shown that women become more interested in casual sex around the time of ovulation and that their mate preferences become more focused on genetic indicators of fitness (e.g., Cantu et al., 2014; Gildersleeve, Haselton, & Fales, 2014). Hormonal research has generally suggested that mammalian sexuality is driven by distinct processes (e.g., proceptivity, receptivity), yet research on the ovulatory shift does not generally use such terms and has rarely examined more than one of these processes concurrently. Where proceptivity or receptivity is explicitly measured, methodological issues may reduce the validity of the findings. For example, to examine receptivity in women across the menstrual cycle, some researchers have had one specific male confederate approach many women to determine whether or not women's menstrual cycle phase predicts their acceptance of such advances (e.g., Gueguen, 2009a). Given robust evidence of individual differences in mate preferences (e.g., Simpson & Gangestad, 1993), additional research is needed using measures of receptive and proceptive behaviour that allow for greater generalizability (e.g., where the measures evaluate women's responses to many men or to a man that they find attractive). Such measures and additional studies are needed to determine how women's menstrual cycle affects both receptive and proceptive mating behaviour.

Further, research has suggested that individual differences in mating strategies may have differential effects on sexual behaviour depending on whether the behaviour is

proceptive or receptive (e.g., Seal, Agostinelli, & Hannett, 1994). However, conceptual issues in the measurement of mating strategies (e.g., measuring short- and long-term strategies along a bipolar continuum rather than as separate constructs) complicates the interpretation of previous findings in this area.

This dissertation aimed to address the gaps in the literature by examining women's proceptive and receptive mating strategies across the menstrual cycle as a function of individual differences in short-term mating orientation. To do so however, a new measure of proceptive and receptive mating strategies was needed to delineate and independently measure these two distinct types of mating behaviours. Further, given the conceptual issues with the measurement of short- and long-term mating strategies, this dissertation used a newly developed scale (Jackson & Kirkpatrick, 2007) that measures these mating strategies as separate constructs. Therefore, the focus of study 1 was to provide additional reliability and validity data for Jackson and Kirkpatrick's (2007) independent measure of short-term mating orientation (STMO) and for the newly developed Proceptive and Receptive Mating Strategies Scale (PARMSS). These measures then allowed for the examination of women's proceptive and receptive mating strategies across the menstrual cycle as a function of short-term mating orientation (Study 2).

Study 1: Reliability and Validity of an Independent Measure of Short-Term Mating Orientation (STMO) and the Proceptive and Receptive Mating Strategies Scale (PARMSS)

Abstract

Study 1 provides reliability and validity data on two recently developed measures. The first measure, Jackson and Kirkpatrick's (2007) multidimensional measure of sociosexuality, was designed to examine short- and long-term mating strategies as distinct constructs; this dissertation examined the short-term mating orientation subscale (STMO), although data from the other subscales are also provided. The second measure, the Proceptive and Receptive Mating Strategies Scale (PARMSS) was developed for this study and measures proceptive and receptive mating strategies using a common metric. Data from 64 women were used to examine the psychometric properties of these two instruments (i.e., reliability and validity). Participants also completed various measures that have been previously related to mating strategies in order to provide validity data for the two measures. For the multidimensional measure of sociosexuality, it was hypothesized that the STMO would be associated with a preference for partners high on social visibility (Hypothesis 1). For the PARMSS, Hypothesis 2 predicted that the PARMSS (both proceptive and receptive scales) would be positively correlated with the STMO. No other hypotheses were put forward regarding the PARMSS as reliability and validity for this measure had yet to be established. Additional variables that have previously found to distinguish between women who were highly oriented towards short-term mating (unrestricted women) and women who were less oriented towards short-term mating strategies (restricted women) were also explored. Results generally supported the use of both measures (i.e., high internal consistency, test-retest reliability, and validity).

Reliability and Validity of an Independent Measure of Short-Term Mating Orientation and the Proceptive and Receptive Mating Strategies Scale (PARMSS).

This study examined proceptive and receptive mating behaviours in new or potential short-term mating interactions and how short-term mating orientation is related to variables known to be associated with mating strategies. Specifically, psychometric data is provided on a new measure of short-term mating orientation proposed by Jackson and Kirkpatrick (2007), which is a supposed improvement on previous measures in that it assesses short-term mating orientation independently from long-term mating orientation. Psychometric data is also provided on the newly developed Proceptive and Receptive Mating Strategies Scale (PARMSS), developed for this study, which assesses proceptive and receptive mating behaviours using a common metric for both.

General Introduction

Sociosexuality/Short-Term Mating Orientation

Sociosexuality refers to one's openness to and engagement in uncommitted sex (Simpson & Gangestad, 1991). Like many traits, sociosexuality exists on a continuum and individuals range from being quite restricted to quite unrestricted in their sociosexual orientation. Individuals with a restricted sociosexuality typically require heavy relational investments before having sex whereas individuals with an unrestricted sociosexuality report being more accepting of casual sex. Unrestricted individuals report having sex sooner in their relationships than their more restricted counterparts (Simpson & Gangestad, 1991) and report lower levels of commitment to their opposite- (e.g., Barta & Kiene, 2005; Hackathorn & Brantley, 2014; Mattingly et al., 2011; Ostovich & Sabini, 2004; Peters, Eisenlohr-Moul, Pond, & DeWall, 2014) and same-sex partners (e.g.,

Markey & Markey, 2013). They also have more concurrent sex partners (Simpson & Gangestad, 1991) and are more likely to engage in behaviours that violate the mores of relationship boundaries than are those individuals with a restricted sociosexuality (Seal, Agostinelli, & Hannett, 1994).

Sociosexuality has been theoretically described as a reflection of one's primary mating strategy (Simpson & Gangestad, 1991). According to Gangestad and Simpson (2000), mating strategies (sometimes referred to as sexual strategies) are evolved systems that serve to orient individuals towards alternative routes to reproduction. Unrestricted women, for example, have improved memory for exaggerated facial masculinity compared to restricted women (Smith, Jones, & Allen, 2013) and unrestricted men report less feelings of tenderness when viewing images of infants (Baell & Schaller, 2014). Further, unrestricted individuals are more likely to misattribute the friendly behaviour of others as "flirtatious" (Howell, Etchells, & Penton-Voak, 2012). These systems guide decision-rules related to reproduction and influence things such as partner preferences and the individual's relative investment in mating versus parental effort. Mating strategies are made up of a host of mating tactics, conditional responses that contribute to the execution of the strategy. Individuals are believed to be essentially capable of enacting any of the alternative tactics (i.e., there is plasticity) but which tactics are expressed depends on a number of factors. One of these factors is the individual's general mating strategy (see Gross, 1996), and in humans, sociosexuality has been used as a measure of mating strategy (see Simpson & Gangestad, 1991).

In many species, individuals are sensitive to environmental conditions and adjust their mating behaviours accordingly (i.e., their mating tactics are flexible and conditional;

see Gross, 1996). In meadow voles for example, females in food deprivation conditions no longer show preferences for male scent markers and are significantly less receptive to male sexual advances (Sabau & Ferkin, 2013). In humans (and many other species, Griffin, Alonzo, & Cornwallis, 2013), both women and men tend to move away from promiscuity when environmental constraints make children's survival dependent on bi-parental care (e.g., Engel, von Hoermann, Eggert, Muller, & Steiger, 2014; Murdock & White, 1969; Price, Pound, & Scott, 2014; Tumulty, Morales, & Summers, 2014), perhaps because male parental effort tends to be related to parental certainty (e.g., Alvergne, Faurie, & Raymond, 2009; Houtson, Szekely, & McNamara, 2013; Platek, Burch, Panyavin, Wasserman, & Gallup, 2002, see below). Similarly, when social living is perceived as violent or unstable (as in war or conflict situations) women tend to have stronger preferences for masculine men (e.g., Little, DeBruine, & Jones, 2013; Marzoli et al., 2013; Sacco, Young, Brown, Bernstein, & Hugenberg, 2012). Although individual differences in sociosexuality continue to exist in such situations, environmental factors contribute to similar tactics across individuals.

Mating tactics also shift according to variables such as disease prevalence; individuals living in areas with high levels of infectious diseases or pathogens tend to be less promiscuous (e.g., Murray, Jones, & Schaller, 2013; Schaller & Murray, 2008) and women place heavier emphasis on genetic indicators of health when choosing a sexual partner (e.g., Penton-Voak, Jacobson, & Trivers, 2004). Individuals also show decreases in affiliation needs when they are primed to think about disease (Sacco, Young, & Hugenberg, 2014), which may serve to orient individuals away from mating opportunities.

Mating strategies in humans are influenced by the sex ratio of the group (i.e., partner availability/scarcity). When women are the minority sex, women and men report less willingness to engage in casual sex (Kandrik, Jones, & DeBruine, 2014) and women place more emphasis on physical attractiveness in partner choice (Munro, Flood, McKellar, & Reudink, 2014). When (investing) men are scarce, women delay starting a family and channel more energy into securing financial independence (Durante, Griskevicius, Simpson, Cantu, & Tybur, 2012). Moreover, women tend to decrease their minimum standards related to facial symmetry (Watkins, Jones, Little, DeBruine, & Feinberg, 2012) and increase their (sometimes risky) courtship behaviours (e.g., Hill & Durante, 2011; Hill, Rodeheffer, Griskevicius, Durante, & White, 2012) when competition for mates is perceived as high.

Additional situational factors also affect mating tactics. In humans, perceiving the social acceptance of potential alternative mates decreases individuals' commitment to their partners and their satisfaction within the relationships (Kavanagh, Fletcher, & Ellis, 2014), which in turn may increase the likelihood of infidelity (Le, Korn, Crockett, & Loving, 2011). Men and women also show shifts in mating preferences depending on whether they are considering a short-term or a long-term relationship (e.g., Lu, 2012; Saad & Gill, 2014). Indeed, flexibility in mating orientations has been demonstrated to provide an evolutionary advantage over fixed mating strategies (e.g., Gowaty, 2013; Milich, Bahr, Stumpf, & Chapman, 2014).

Several processes are involved in and contribute to mating strategies. For example, higher disgust sensitivity predicts stronger attraction to physical indicators of health (e.g., Jones et al., 2012; Jones et al., 2013). Similarly, research on individual

differences in “night owl versus early bird” has shown that men who classify as night owls report more sexual partners than do early birds (Randler et al., 2012) and short-term mating strategies are related to eveningness in women and men (Jankowski, Diaz-Morales, Vollmer, & Randler, 2014; Maestripieri, 2014). Further, opposite-sex friendships are rated as more important to unrestricted individuals as compared to restricted individuals (Salkicevic, 2014) and short-term mating orientation is negatively related to men’s experience of tenderness when looking at pictures of babies (Beall & Schaller, 2014). These findings suggest that mating strategies are likely made up of many seemingly unrelated mechanisms.

Personality is considered an underlying domain that facilitates mating strategies in both women and men (e.g., Carter, Campbell, & Muncer, 2014). For example, extraversion has been related to higher short-term mating success (Nettle, 2005; Olmstead, Pasley, & Fincham; 2013; Randler et al., 2012), sociosexual unrestrictedness, mate poaching attempts/receptivity to mate poaching, and history of infidelity (Schmitt & Shackelford, 2008). Agreeableness and conscientious are important factors negatively associated with number of sex partners and infidelity (Schmitt & Shackelford, 2008) and openness has been related to sensation seeking and less restrictive sexual attitudes (e.g., Copping, Cambell, & Muncer, 2013; Webster & Crysel, 2012). Further, high extraversion has been related to unplanned pregnancies in both men and women (Berg, Rotkirch, Vaisanen, & Jokela, 2013). Interestingly, religiosity is generally related to sexual restrictedness and this relation is particularly pronounced in women with high extraversion/low emotional stability (Kardum, Gracanin, & Hudek-Knezevic, 2008).

Certain mating tactics may be more likely given the interactions that arise through individual differences in personality.

Individuals also differ in the cognitive abilities that contribute to reproductive success, a term called *mating intelligence* (e.g., Geher & Kaufman, 2007). For example, individuals scoring high on mating intelligence are better at predicting the mating intentions of opposite-sex partners (Geher, 2009) and attracting opposite-sex partners (Geher & Kaufman, 2007) than are individuals scoring low on mating intelligence. High mating intelligence men report more uncommitted sex partners (with strangers, acquaintances, and friends) than do low mating intelligence men while high mating intelligence women (compared to low mating intelligence women) only report more uncommitted sex with acquaintances (i.e., men who could also be potential long-term partners) (O'Brien, Geher, Gallup, Garcia, & Kaufman, 2010). Although sociosexuality and mating intelligence appear to be related to similar traits, they are unrelated to each other suggesting that these constructs are distinct (Peterson, Geher, & Kaufman, 2011).

Theoretical background

The foundational underpinnings of mating strategies rest on the theories of sexual selection and parental investment. Sexual selection (Darwin, 1859; 1871) is similar in rationale to natural selection except that rather than focusing on constructs that contribute to enhanced survival, sexual selection posits that evolution favours those adaptations that lead to successful reproduction, even if those adaptations have survival costs.

The parental investment theory (Trivers, 1972) builds on sexual selection by suggesting that the energy an individual has available to spend on survival or reproduction is limited. Generally, any energy spent on survival cannot be spent on

reproduction and energy spent on reproduction cannot be also spent on survival. Energy spent on reproductive goals can be allocated via one of two routes (or some combination thereof): 1) mating effort (e.g., finding a mate, attracting a mate), or 2) towards parental effort (e.g., provisioning offspring until independence, protecting offspring from predators). Trivers predicted sex differences in mating strategies based on differential parental investment in that whenever parental care was unbalanced between the sexes (as is the case in humans), the sex that bore more of the costs would also be more selective in their decisions to reproduce and about their choice of mates.

The parental investment theory (Trivers, 1972) predicted that females' reproductive strategies would more likely be oriented to parental care than would be the strategies of males, who would invest more relative energy towards mating effort. This was predicted because females typically faced higher obligatory costs associated with mating (e.g., pregnancy). Trivers also suggested that males might be less choosy than females because the benefits of engaging in sex with many partners had the potential to directly increase reproductive success (to the degree that offspring survival was not dependant on paternal care) whereas females' number of offspring was generally related to biological constraints (e.g., length of gestation) and not by number of sexual partners per se (but see Hrdy, 1981, who argues that female promiscuity increases female reproductive success indirectly by decreasing male-committed infanticide).

Another important contribution of the parental investment theory (Trivers, 1972) was the tenant that the amount of energy devoted to parental care was related to parental certainty (the likelihood that one is the biological parent of the offspring). This is significant because energy devoted to parental care must necessarily be diverted away

from energy spent in other ways, such as on mating effort, parenting effort devoted to other or future offspring, or effort devoted to the problems of survival. Female mammals gestate internally and consequently, any parental investment they made was sure to go to their biological offspring. Males, on the other hand, could never completely eliminate the possibility of cuckoldry. As such, the relative benefit that males could reap from energy devoted to parental effort was necessarily lower, so males overall were predicted to devote less energy to parental care than were females, who did not face this uncertainty. Suggesting that human males' pattern of parental investment is related to parental certainty, recent studies show that men who are rated as more phenotypically similar to their children (using objective facial and odour cues) devote more energy to parental care and such men have healthier children as compared to children who are objectively rated to be less similar to their fathers (Alvergne, Faurie, & Raymond, 2009). Women, on the other hand, are less sensitive to cues of relatedness (e.g., Wu, Yang, Sun, Liu, & Luo, 2013) and cues of offspring relatedness do not elicit more parental investment from women as they do in men (e.g., Platek et al., 2002).

Sex Differences

Trivers' theory of parental investment (1972) predicted sex differences in mating orientations based on the tenants above and research has widely supported the hypothesis that men overall are in fact more oriented towards short-term mating strategies than are women (e.g., Beaussart & Kaufman, 2013; Brase, Adair, & Monk, 2014; Buss & Barnes, 1986; Simpson & Gangestad, 1991; Sprecher, Treger, & Sakaluk, 2013; Varella, Valentova, Periera, & Bussab, 2014). Men have more fantasies about strangers (e.g., Ellis & Symons, 1990), indicate more willingness to have sex with strangers (e.g., Buss &

Schmitt, 1993), and report a desire for a larger diversity of future sex partners (e.g., Schmitt et al., 2003) as compared to women.

Although Trivers (1972) predicted these sex differences, the parental investment theory also predicted within-sex variation in mating strategies and specifically that the "optimal" strategy would depend on a combination of factors. Research has supported that indeed, not all men are oriented towards short-term mating strategies and not all women are oriented towards long-term mating strategies (Simpson & Gangestad, 1991). In fact, the differences within the sexes are often larger than the differences between the sexes (e.g., Clark, 2006; Eysenck, 1976; Gangestad & Simpson, 2000), suggesting that a wide range of attitudes and behaviours relating to mating strategies exists for both men and women.

Research examining correlates of sociosexuality reveals that men who report being highly promiscuous (i.e., unrestricted) are objectively rated as more physically attractive than are less promiscuous men (Gangestad & Simpson, 2000; Honekopp, Rudolph, Beier, Liebert, & Muller, 2007; Hughes & Gallup, 2003; Perilloux, Cloud, & Buss, 2013; Reise & Wright, 1996; Thornhill & Gangestad, 1994). Similarly, such men indicate that women frequently notice them and find them attractive and they believe that they can easily acquire a sexual partner (Landolt, Lalumiere, & Quinsey, 1995). It appears then, that more physically attractive men enact the short-term strategy more often than do less physically attractive men (e.g., Perilloux, Cloud, & Buss, 2013; Webster & Bryan, 2007), possibly because they possess traits that are attractive to women who are considering short-term mating opportunities (e.g., Valentine, Li, Penke, & Perrett, 2014

but see Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008 who found a negative association between men's physical attractiveness and sociosexual orientation).

The effect of female attractiveness on sociosexuality has not been so definitive. Attractive women are generally more able to execute long-term mating strategies by pairing with high-quality mates (e.g., Buss & Shackelford, 2008). Despite this, attractive women (both self- and other-rated) report higher numbers of sex partners (e.g., Honekopp et al., 2007; Lukaszewski, Larson, Gildersleeve, Roney, & Haselton, 2014; Penke & Asendorpf, 2008; Perilloux, Cloud, & Buss, 2013) but not necessarily more unrestricted sociosexual identities (e.g., Clark, 2004; Lukaszewski et al., 2014; Perilloux et al., 2013; Stillman & Maner, 2009). Further, women's attractiveness is neither related to women's self-perceived ability to acquire good mates or her actual number of sex partners (Mikach & Bailey, 1999), despite this being a fairly robust finding in men.

Nonetheless, unrestricted women tend to have particular mate preferences. Unrestricted women overall are more likely to prefer socially visible, attractive, and dominant men whereas restricted women are overall more likely to prefer men who are high on parenting qualities (e.g., Provost, Kormos, Kosakoski, & Quinsey, 2006; Provost, Troje, & Quinsey, 2008; Quist et al., 2012; Simpson & Gangestad, 1992). Moreover, unrestricted women (and men) are actually better able to identify facial symmetry (e.g., Sacco, Hugenberg, & Sefcek, 2009). These studies suggest that unrestricted women may place higher value on physical characteristics as compared to restricted women.

Measurement of Sociosexuality

Part of the difficulty with explaining how mating strategies are expressed is that researchers have not come to a clear consensus on how mating orientations should be

operationally defined and subsequently measured. One of the most widely used measures of sociosexuality is the Sociosexuality Orientation Inventory (SOI) developed by Simpson and Gangestad (1991). This seven-item scale measures two factors: attitudes and behaviours related to uncommitted sexual behaviours. The SOI has been shown to possess convergent validity, in that unrestricted individuals have been shown to have more concurrent sex partners and report having sex sooner in the relationship than their more restricted counterparts (Simpson & Gangestad, 1991). Sociosexuality is not related to frequency of sex among sexually active couples (Simpson & Gangestad, 1991), meaning that sociosexuality is a different construct from sex drive (but see Szepsenwol, Mikulincer, & Birnbaum, 2013). Test-retest reliability of this test is quite good; over a 6 week period, reported reliabilities are .89 for men and .82 for women (Ostovich & Sabini, 2004).

Although the SOI is the most common measure of sociosexuality, researchers have pointed out several shortcomings of the measure (e.g., Jackson & Kirkpatrick, 2007). Perhaps one of the most widely cited criticisms of the SOI is that it measures sociosexuality along a single bipolar continuum, with individuals scoring on the low end classified as seeking long-term relationships and individuals scoring on the high end classified as seeking short-term relationships (Buss & Schmitt, 1993). However, evolutionary theorists generally agree that individual males and females have the capacity to implement a variety of strategies and at times will do so concurrently (e.g., Holtzman & Senne, 2014). This is in line with evidence indicating that men and women do not differ in their desire for long-term relationships despite robust sex differences in desire for short-term relationships (e.g., Buss & Schmitt, 1993; Jackson & Kirkpatrick, 2007).

As such, the term s*ociosexuality* as used in previous research likely reflects individuals' short-term mating orientation but does not measure or reflect their long-term orientation. Given this distinction between mating strategies, the use of the term sociosexuality in this dissertation is meant to reflect individuals' short-term mating orientation, despite the fact that other research has not previously made this distinction.

A further problem with the SOI (Simpson & Gangestad, 1991) is that the scale score is derived from both attitudinal and behavioural items. Although the authors explicitly used both attitudinal and behavioural items in order to capture the full domain of sociosexuality, critics have argued that these two factors do not always overlap (e.g., Webster & Bryan, 2007). It may be the case (more so for men) that the number of sex partners one desires (i.e., attitudinal item of SOI) largely outweighs the number of sex partners one can actually obtain (i.e., a behavioural item of SOI). Research has supported the suggestion that there is no single factor that represents the SOI (Webster & Bryan, 2007) and a revised version of the SOI developed by Penke and Asendorpf (2008) further supported the theory that the SOI is made up of three distinct factors (i.e., attitudes, behaviours, and desires).

The SOI has also been criticized in terms of its internal consistency. Across samples, internal consistency is quite varied and sometimes falls below the conventional level of acceptability. For example, Schmitt (2005) examined Cronbach's alphas across 48 different samples. The results indicated Cronbach's alphas ranged from .31 to .86. However, Schmitt was using the SOI to measure sociosexuality across cultures, so the low Cronbach alphas that were detected might speak more to a lack of cross-cultural appropriateness rather than to internal validity per se.

In an effort to create a more complete and valid measure of sociosexuality, Jackson and Kirkpatrick (2007) developed a 20-item multidimensional measure of sociosexuality (hereafter referred to as the MDSOI) that separately assesses short-term mating orientation (STMO), long-term mating orientation (LTMO), and previous sexual behaviours (PSB). Demonstrating the psychometric properties of the tool, Jackson and Kirkpatrick found that STMO and LTMO were uncorrelated. Further, men and women were similar in terms of LTMO whereas sex differences emerged in terms of their STMO, with men scoring higher in short-term mating tactics.

Thus, the SOI may be the most common tool for measuring short-term mating strategies, but Jackson and Kirkpatrick's STMO (2007) may be more appropriate. The SOI only measures the extent to which one is interested in short-term mating strategies, whereas the MDSOI measures both short-term and long-term strategies. Even if one is only interested in measuring short-term mating strategies, the MDSOI may prove more valid, since the existence of dual-mating strategies suggests that short-term mating strategies should be examined separately from long-term mating strategies. The MDSOI distinguishes between short-term and long-term mating strategies and does not measure them along a single continuum. Jackson and Kirkpatrick (2007) found good internal consistency for their measure and some limited construct validity but further data is needed to support the initial validity and reliability findings outlined by the authors.

Proceptive and Receptive Mating Strategies

Not only can mating strategies be classified as short-term or long-term oriented, mating strategies can be described in terms of different processes. In animal research, mating behaviours are typically classified into one of three categories (e.g., Beach, 1976;

McCarthy & Becker, 2002; Sabau & Ferkin, 2013): attractivity (how attractive one is as a sexual partner to the opposite sex, for example through physical looks, ornamentation, or pheromone secretion), proceptive behaviours (the active components of mating behaviour, including attraction to specific partner traits) and receptive behaviours (the acceptance or rejection of the sexual advances of an individual). These three components are distinct (e.g., Hobbs, Finger, & Ferkin, 2012; Martinez & Petrulis, 2013; Moncho-Bogani, Lanuza, Lorente, & Martinez-Garcia, 2004; Sabau & Ferkin, 2013; Ventura-Aquino & Fernandez-Guasti, 2013a; Ventura-Aquino & Fernandez-Guasti, 2013b) but often shift together (e.g., de Jonge, Mekking, Abbot, & Wiepkema, 1994; Tilbrook, Hemsworth, Topp, & Cameron, 1990). Further, the processes likely interact; for example, proceptive displays may increase attractivity and consequently increase the opportunity to display receptive behaviours (e.g., Appelt & Sorensen, 2007; Swierk, Myers, & Langkilde, 2013; Tinghitella, 2014).

Similar distinctions exist in human mating behaviours with sex drive, attraction, and attachment being influenced by different biological processes (see Fisher, 1998). As in other species, however, such processes are related and sometimes difficult to objectively distinguish (e.g., Gersick & Kurzban, 2014). Further, proceptive displays are attractive to opposite-sex partners (e.g., Goetz, Easton, & Buss, 2014), can influence attractivity (e.g., Brown, Daniels, Lustgraaf, & Sacco, 2014; Clark, 2008; Fink, Hugill, & Lange, 2012), and often result in increased mating success (e.g., Arnocky, Sunderani, & Vaillancourt, 2013). Unrestricted women, for example, report higher rates of sexual harassment than do restricted women (Kennair & Bendixen, 2012), suggesting that they experience more opportunity for receptive mating behaviours than do restricted women,

albeit from men they do not desire. Nonetheless, proceptive and receptive mating strategies may be distinct, just as women's explicit and implicit mate preferences have been shown to be unrelated (Eastwick, Eagly, Finkel, & Johnson, 2011).

Although previous research has established that restricted women are generally less proactive in searching for an extra-pair mating opportunity than are unrestricted women (e.g., Treger & Sprecher, 2011), some research has questioned the predictive validity of sociosexual orientation. For example, self-rated impulsivity (Boothroyd & Brewer, 2014) or sexual desire (O'Connor et al., 2014) may be stronger predictors of partner preferences for masculinity than is sociosexuality. Further, when women are actively pursued by men for an affair, sociosexuality no longer predicts which women will engage in the affair and who will not; in their study of infidelity, Seal and colleagues (1994) found that women in general indicated low levels of initiating behaviours that would violate their primary relationships although unrestricted women did tend to report a higher likelihood of engaging in these behaviours. However, women overall (regardless of sociosexual orientation) became increasingly willingly to engage in these same behaviours when they were the passive players (e.g., both restricted and unrestricted women were more likely to give their phone number to a man who asked for it than to either offer him her number or to ask him for his), suggesting that although sociosexuality might predict women's proceptive behaviours, it does not predict women's receptive sexual behaviours.

Although the operational definition of receptivity was slightly different from the way receptivity is described in this dissertation, similar findings were obtained by Fisher and Cox (2009), who asked women to indicate whether they would or would not be

interested in engaging in a relationship (one-night stand, short-term, or long-term relationship) while individually considering 30 photos of male faces. It was found that sociosexuality did not differentiate those women who expressed interest in many men (i.e., highly receptive) from those women who expressed interest in few men (i.e., low in receptivity), suggesting that sociosexual orientation is not strongly tied to women's receptive sexual interest.

Complicating these results on female sexual strategies is the fact that research from the last 50 years has indicated that men are the primary initiators of romantic relationships, as they tend to be the first to initiate verbal and physical contact (e.g., Clark, Shaver, & Abrahams, 1999; Eaton & Rose, 2011; Lamont, 2014; Rose & Frieze, 1989; Serewicz & Gale, 2008). This may have contributed to there being less focus on delineating predictors of women's proceptive versus receptive mating behaviour. It is unclear then, how sociosexuality relates to women's proceptive and receptive sexual behaviours and whether sociosexuality relates to each in a similar fashion. No previous studies have explicitly examined these questions.

Study 1 therefore had two goals. First, it sought to provide reliability and validity data for the multidimensional measure of sociosexuality proposed by Jackson and Kirkpatrick (2007), more specifically for the short-term mating orientation subscale (STMO) because it is theoretically most similar to the original measure of sociosexuality proposed by Simpson and Gangestad (1991). As such, measures related to constructs known to vary with sociosexuality or short-term mating orientations (e.g., personality, self-perceived mate quality, see below) were administered to evaluate their relationship with the STMO. Two laboratory sessions allowed for examination of test-retest reliability

for the STMO (and many other measures of interest). Given the supposed theoretical improvements in the MDSOI, it was generally predicted that the STMO would be associated with variables found to be associated with sociosexual orientation in previous research. Thus, Hypothesis 1 was that STMO would be associated with partner preferences in that unrestricted women would show a stronger preference for social visibility than would restricted women. No other specific hypotheses were made but other variables were explored to examine their relation to STMO. Although this study was primarily focused on the short-term mating orientation subscale of the MDSOI proposed by Jackson and Kirkpatrick (2007), data is nonetheless provided for the other subscales. These analyses will explore evidence for convergent and divergent validity of the STMO.

The second goal of Study 1 was to develop and explore the reliability and validity of a new measure designed to assess individuals' concurrent use of proceptive and receptive mating strategies. No published measures that explicitly assess both proceptive and receptive mating strategies exist for humans. Hypothesis 2 was that both proceptive and receptive mating strategies would be positively associated with short-term mating orientation (i.e., the STMO). Additional data is provided to explore the psychometric properties of the PARMSS.

Method

Participants

Women were recruited through undergraduate psychology courses, community event pamphlet distributions, and poster advertisements on a university campus. Some women (n = 44) received course research credit for participation. Several selection/exclusion criteria were applied to control for exogenous hormones (e.g.,

hormonal contraceptives), abnormal hormone functioning (e.g., thyroid problems or depression), or hormonal states not associated with the fertile period (e.g., pregnancy), as is common in menstrual cycle research (see e.g., Fisher, 2004; Tracy & Beall, 2014; Wlodarski & Dunbar, 2013). These criteria were used for the purpose of study 2, but ultimately, these exclusion criteria were ideal for this study as it allowed us to examine the psychometric properties of the measures in a free-cycling sample unaffected by exogenous hormones or hormonal disorders. Sexual orientation was used as an additional exclusion criterion at the analysis stage for some analyses, primarily due to the methodology of the current study (i.e., only male stimuli were used). To ensure generalizability, however, women reporting any orientation towards men (even those reporting a 'predominantly homosexual' orientation) were included in the study.

In total, 164 women completed and submitted the screening questionnaire. Many of these women (n = 74) were not invited to participate in the rest of the study due to the following exclusion criteria: (a) use of any form of hormonal contraceptive or hormonal medication within the past three months (n = 58), (b) a medical or psychiatric condition (e.g., hypothyroidism or depression, respectively) that is known to affect normal hormone fluctuations (n = 1), (c) currently pregnant, lactating, or menopausal (n = 2), (d) irregular menstrual cycles (regular menstrual cycles were defined as consistently lasting between 26 and 32 days of length) (n = 10), and (e) an exclusive same-sex orientation (n = 3; defined as a rating of 9, *exclusively homosexual*, on a Likert-type 9-point rating scale of sexual orientation).

After the exclusion criteria were applied, 90 women were eligible to participate. Of those, 26 women did not respond to invitations to participate. In total, 64 women

participated in at least one portion of the two laboratory phases. The average age of these participants was 21.82 years old (*SD* = 6.13) and 53 participants (83% of the sample) were of European descent.

Measures and Materials

The items/scales administered to participants were grouped into eight categories: Screening questions, demographic questions, reproductive/hormonal questions, general relationship questions, general sexuality questions, current relationship questions (only administered to participants currently in a romantic relationship), miscellaneous questions, and the PARMSS. Each is described below.

Screening questionnaire. Participants completed the 26-item screening questionnaire (see Appendix A), which included items relating to demographics (e.g., age, sex, sexual orientation, age of menarche, relationship status, number of biological children). Information relevant to normal menstrual cycle (e.g., typical menstrual cycle length, absence of pregnancy/lactation) and hormonal functioning was queried to satisfy selection/exclusion criteria (e.g., medical diagnoses, medications). It also queried frequency of attendance at religious ceremonies/activities and how strongly one wished to avoid pregnancy at the time. The sexual orientation question was developed by Kinsey, Pomeroy, and Martin (1948) while the remainder of the items were adapted from previous studies in our lab (e.g., Morris & Oinonen, 2007; Oinonen & Mazmanian, 2007) or developed for this study.

After being selected for participation, women completed a variety of paper-and-pencil measures during the laboratory session that were grouped according to the remaining general categories listed above.

Demographic questions. Participants completed six questions pertaining to personal information (see Appendix B). They provided age and ethnicity, height and weight (to calculate BMI), and education levels of each parent (as a proxy for SES).

Reproductive/hormonal questions. Items assessing current and past hormonal status were queried, mainly for selection/exclusion criteria. Participants responded to several questions regarding their reproductive history and hormonal status (see Appendix C). They were asked about their menstrual cycle, reproductive histories (e.g., length of typical menstrual cycle), current hormonal medication use, current medical conditions (e.g., hyperthyroidism), and their use of oral contraceptives or other medications/diagnoses that could interfere with natural hormone levels. Many questions from the screening questionnaire were duplicated in this questionnaire in case any of these variables had changed between the time they completed the screening questionnaire and the time they participated in the laboratory session.

General relationship questions. Relationship history and status were assessed (see Appendix D). Items included current relationship status, the length of longest romantic relationship, the number of long-term relationships they have ever had, and whether or not they have ever been divorced. Participants also completed the Romantic Partner Attribute Index (Simpson & Gangestad, 1992), which is a 15-item scale designed to measure two domains of partner preferences: parenting/personal qualities and attractiveness/social visibility. Participants rated how important it was to them that their romantic partner possess each attribute on a Likert-type scale ranging from 1 (*not at all important*) to 9 (*extremely important*). Sample items include “Desire for children” and “Financial resources”. Cronbach’s alphas for this scale were .81 for the

parenting/personal qualities subscale (n = 59) and .83 for the attractiveness/social visibility subscale (n = 61).[1]

Participants also completed the Attitudes Towards Infidelity (ATI) scale developed by Whatley in 2006 (published by Knox & Schacht, 2008). This is a 12-item self-report scale measuring general attitudes towards infidelity. Sample items include "It is natural for people to be unfaithful" and "Being unfaithful in a relationship is one of the most dishonourable things a person can do". Items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). One additional question was added to this measure: "I would be more likely to forgive my partner for infidelity if I knew it was 'just sex'". The added item was included for exploratory purposes and is not included in the scale score. Scores range from 12 to 84, with higher scores reflecting greater endorsement of infidelity. This scale has good internal validity (.80) and has been shown to relate to individuals' history of infidelity (Knox & Schacht, 2008). Cronbach's alpha for this scale was .74 (n = 56) in this study.

General sexuality questions. General sexuality questions were also asked (see Appendix F). Participants were asked about general sexual behaviours, such as the age at which they first had sexual intercourse, their number of sexual partners, their history of infidelity, their frequency of masturbation, the ease with which they achieve orgasm, their tendency to fake orgasms with a partner, and their sexual activity in the last three days. Several previously published scales were also used (see below); all other items were developed for this study.

[1] Cronbach's alphas were computed based on data provided at the first session. See Appendix E for list of Cronbach alpha's computed for this study.

Items measuring general sexual satisfaction from the Pinney Sexual Satisfaction Inventory (PSSI) were administered (Pinney, Gerrard, & Denney, 1987). The PSSI is a 24-item self-report measure that yields two scores: general sexual satisfaction and satisfaction with partner. The 14 items relating to general sexual satisfaction were administered in this section while the other 10 items (measuring satisfaction with a partner) were only completed by those participants in a relationship (see below). These items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I am satisfied with the frequency with which I have orgasms" and "I am satisfied with the frequency with which I have intercourse". Scores are summed to indicate general sexual satisfaction and range from 14 to 98, with higher numbers indicating greater general sexual satisfaction. The 14 item subscale measuring general sexual satisfaction had a Cronbach's alpha of .95 in this study (n = 34).

Participants also completed the items from Jackson and Kirkpatrick's (2007) multidimensional SOI (hereafter referred to as MDSOI). This measure includes five identical items of the Sociosexuality Orientation Index (SOI) developed by Simpson and Gangestad (1991)[2]. It also contains four items from the Interest in Uncommitted Sex scale developed by Bailey, Gaulin, Agyei, and Gladue (1994). There are also additional questions investigating short-term and long-term mating orientations. In total, this measure contains 20 items. Seventeen of the items are rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "Sex

[2] SOI item number 4 and number 7 were excluded from the multidimensional measure of SOI from Jackson and Kirkpatrick (2007) because they did not load on any of their three factors. These items were: 'How often do you fantasize about members of the opposite sex other than your current partner' and 'With how many members of the opposite sex do you foresee having sexual intercourse during the next 5 years?'. These items were still included in the present study for exploratory purposes but were not used in calculating the multidimensional SOI scale scores.

without love is OK" and "I hope to have a romantic relationship that lasts the rest of my life". The remaining three items ask participants to provide the number of men that they have ever had sex with, the number of men that they have had sex with in the last year, and the number of men they have had sex with on only one occasion. This scale provides three scores for each participant. Ten items are summed together to calculate the Short-Term Mating Orientation (STMO) score and seven items are summed together to create the Long-Term Mating Orientation score (LTMO). For the Previous Sexual Behaviours (PSB) score, the three items are transformed to Z-scores before aggregating them for a total score. For the STMO and LTMO scores, higher scores indicate a higher preference for that strategy. For the PSB, higher numbers indicate more sexual partners. Jackson and Kirkpatrick (2007) found good internal consistency for the STMO, the LTMO, and the PSB scales (Cronbach alphas = .95, .88, and .83, respectively) (n = 167 males and 161 females). They also demonstrated validity in that, for men, LTMO was related to personal/parenting qualities while STMO was related to attractiveness/social visibility. In addition to examining the STMO as it relates to other variables, the STMO was also examined as a grouping variable. To create unrestricted and restricted groups, participants were categorized as belonging to either high or low sociosexuality groups based on a median split of scores on the STMO subscale of the MDSOI (Jackson & Kirkpatrick, 2007).

Current relationship questions (only for participants currently in a romantic relationship). Participants currently in a romantic relationship also completed questionnaires regarding the quality of their current relationships (see Appendix G). Participants completed the seven-item Relationship Assessment Scale (Hendrick, 1988).

The Relationship Assessment Scale (RAS) is a global indicator of relationship quality. Items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include "My partner meets my needs" and "In general, I am satisfied with my relationship". Items are summed together and scores can range from 7 to 35. Higher scores indicate a greater satisfaction with the relationship. The internal reliability of this scale is good (.86), it is highly correlated with other measures (such as the Dyadic Adjustment Scale; Spanier, 1976), it discriminates between couples who stay together and couples who break up (Hendrick, 1988), and it has reported test-retest reliabilities of r = .74 (Renshaw, McKnight, Caska, & Blais, 2011). Cronbach's alpha (n = 26) for this study was also good (.91).

Also administered to partnered women was the Index of Sexual Satisfaction (Hudson, Harrison, & Crosscup, 1981), a 25-item self-report measure investigating the degree of sexual satisfaction within a romantic relationship. Items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include "I feel that my partner enjoys our sex life" and "my sex life is monotonous". Scores are summed to yield a total score, ranging from 25 to 125, with higher scores indicating greater satisfaction. This test has measured internal consistencies and test-retest reliabilities in excess of .90 and discriminant validity coefficients of .76 (Hudson, Harrison, & Crosscup, 1981; Mark, Herbenick, Fortenberry, Sanders, & Reece, 2014). Cronbach's alpha in this study (n = 17) was good (.95).

Participants who were in a romantic relationship also completed the Love Scale (Rubin, 1970), which is a 13-item self-report measure of love in a current relationship. Items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 9 (*strongly*

agree). Sample items are "If I could never be with my partner, I would feel miserable" and "If I were lonely, my first thought would be to seek my partner out". Scores on this scale range from 13 to 117, with higher scores indicating more feelings of love. This scale has demonstrated good internal consistency (.84 for women and .86 for men; Rubin, 1970). In this study, Cronbach's alpha was found to be .89 (n = 27).

Participants in a relationship also completed the other 10 items of the Pinney Sexual Satisfaction Scale (Pinney, Gerrard, & Denney, 1987) that make up the Satisfaction with Partner subscale. Items are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I wish my partner were more sensitive to my physical needs when we make love" and "I wish my partner were more romantic when we make love". Scores range from 10 to 70, with higher scores indicating greater satisfaction with partner. Cronbach's alpha in this study was .86 (n = 20).

Participants in a relationship also completed an adaptation of the Romantic Partner Attribute Index (Simpson & Gangestad, 1992) and an adaptation of the Self-Perceived Mating Success scale (Landolt, Lalumiere, & Quinsey, 1995). For both of these scales, participants responded to the items in terms of how they perceive their current partner. That is, rather than responding to ideal partner preferences, the RPAI in this section asked participants to rate their current partner *as they actually are* on each of the attributes. For the Romantic Partner Attribute Index, participants were asked to rate their current partner on each of the attributes of the scale (e.g., "Desire for children" and "Attractiveness"). For the Self-Perceived Mating Success scale, several items were rephrased so that individuals rated their perception of their mate's quality. For example,

the item “Members of the opposite sex tend to notice me” was changed to “Women tend to notice my partner”. The item “Members of the opposite sex that I like tend to like me back” was deleted while two items were added for exploratory purposes but were not used in the calculation of the overall score. These items were: “I find my partner to be physically attractive” and “My partner is very social/extroverted”. These two adapted measures were included to assess a woman’s perception of her mate’s qualities and her perceptions of his overall mate quality. Cronbach’s alpha for the RPAI was .80 for the four items making up the parenting subscale (n = 27) and .71 for the eight items making up the social visibility subscale (n = 27). Cronbach’s alpha for the adapted Self-Perceived Mate Quality scale was .72 (n = 24).

Participants also completed several questions regarding other sexual behaviours and infidelity in the current relationship (e.g., “Have you had sexual intercourse with your current romantic partner?”, “During your current relationship, have you had sexual intercourse with a person other than your current partner”). These questions were developed for the current study.

Other miscellaneous questions. Several other questionnaires were included in the questionnaire package (see Appendix H). Participants were administered the Body Esteem Scale (Franzoi & Shields, 1984), a 35-item self-report measure indicating one’s satisfaction with various parts of one’s body. Items are rated on a Likert-type scale ranging from 1 (*strong negative feelings*) to 5 (*strong positive feelings*). Items are divided into three subscales: Sexual attractiveness (14 items; e.g., lips, cheeks/cheekbones), weight concern (9 items; e.g., weight, figure/physique), and physical condition (9 items;

e.g., agility, physical coordination)[3]. Scores are summed within each subscale; higher scores indicate greater positive feelings about one's body. Published coefficient alpha's for this scale range from .78 to .87 (Franzoi & Shields, 1984). In this study, Cronbach's alphas were found to be .79 for the sexual attractiveness scale (n = 57), .91 for the weight concern scale (n = 64), and .87 for the physical condition scale (n = 62).

Participants also completed the Self-Perceived Mating Success scale (Landolt, Lalumiere, & Quinsey, 1995). This is an 8-item self-report measure. Sample items include "Members of the opposite sex that I like tend to like me back" and "I can have as many sexual partners as I choose". Items are rated on a Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores are summed together, and can range from 8 to 56, with higher scores indicating a self-perception of higher mate quality. Internal consistency for this scale is good (.83; Landolt, Lalumiere, & Quinsey, 1995). Cronbach's alpha in this study was found to be .91 (n = 63).

To measure self-perceived attractiveness, participants completed the Self-Perceived Attractiveness Scale (SPAS), which is a six item scale including items such as "members of the opposite sex think that I am not very physically attractive". Items are rated on a Likert-type rating scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). This is a common way of measuring self-perceived attractiveness (e.g., Weeden & Sabini, 2007). Five of these items were adapted from an unpublished study (Morris & Oinonen, 2007); the last item was developed for this study. Items are summed to produce a self-perceived attractiveness score. Scores can range from 6 to 42 with higher scores

[3] 3 items were not included in the analyses, as these items (i.e., muscular strength, width of shoulders, and arms) are only used to calculate BES scores for men.

indicating a higher self-perceived attractiveness. Cronbach's alpha (n = 64) in this study was good (.76).

Participants also completed Goldberg's (1992) Big Five personality inventory. This is a 100-item self-report measure asking individuals to describe themselves in terms of different adjectives (e.g., Assertive, Innovative, Generous). Items are rated on a Likert-type rating scale ranging from 1 (*extremely inaccurate*) to 9 (*extremely accurate*). This scale yields five scores: Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. This scale has good validity in that the scales correlate highly with other measures of the Big Five (e.g., the NEO-PI; Goldberg, 1992). Cronbach's alphas for the scales were good in the present study: Extroversion (.83; n = 52), Agreeableness (.82; n = 53), Conscientiousness (.81; n = 49), Neuroticism (.82; n = 51), and Openness to Experience (.82; n = 51).

Participants also completed Crowne and Marlowe's (1960) 33-item Social Desirability Scale. This scale measures the extent to which individuals tend to present themselves in a socially desirable way. Items are rated either True or False. Sample items include "I am sometimes irritated by people who ask favours of me" and "There have been times when I have been jealous of the good fortune of others". Scores range from 0 to 33, with higher scores indicating a higher tendency to present oneself in a positive light. This scale has been demonstrated to have high internal consistency (.90 for men and .76 for women; Renaud & Byers, 2001). Test-retest reliability after one month is good (.89; Crowne & Marlowe, 1960). This scale is highly correlated with self-esteem (Ray, 1988), denial of drug use (Richter & Johnson, 2001), and with the L and K scales

of the MMPI (Crowne & Marlowe, 1960), indicating good convergent validity. In this study, Cronbach's alpha fell just below conventionally acceptable levels (.69; n = 59).

Finally, participants completed two items regarding the extent to which their faith/religion affects their sexual attitudes and behaviours. Items were rated on a 7-point Likert-type scale ranging from 1 (*not at all*) to 7 (*extremely).* These items were developed for this study.

Proceptive and Receptive Mating Strategies Scale (PARMSS). To measure proceptive and receptive mating behaviours in new/potential relationships, participants were administered the Proceptive and Receptive Mating Strategy Scale - Imaginary (PARMSS-I) and Proceptive and Receptive Mating Strategy Scale – photo (PARMSS-P) versions (see Appendix I). The scales were developed for the purpose of this study and can be administered while the participant *imagines* a partner (PARMSS-I) or when considering *photographs* of specific males (PARMSS-P). The mating behaviours examined in each version were chosen to reflect a range of behaviours that might be typical early on in romantic/sexual relationships and that could be examined from both a proceptive and receptive perspective.

In the PARMSS, participants rate their hypothetical likelihood of engaging in various mating behaviours across three different vignettes. The first vignette, the classroom scene, presents a scenario in which the participant has been paired with a male to complete a class assignment. They have supposedly just spent several hours completing the project together and the participant is told to imagine that she is "interested" in him. The participant then responds to eight items regarding mating behaviours, each of which is posed in a proceptive manner (e.g., 'How likely would you

be to ask him for his phone number?') and a receptive manner (e.g., 'How likely would you be to give him your phone number if he asked for it?'). Responses are rated on a Likert-type scale ranging from 1 (*not at all likely*) to 9 (*extremely likely*).

The second vignette, the nightclub scene, presents the situation where later that same night, the participant and the male happen to be at the same nightclub. Further, a mutual friend has supposedly told the participant that this man is "interested" in her. Participants then respond to 28 items (14 proceptive items and 14 receptive items) regarding mating behaviours at the club (e.g., 'How likely would you be to buy him a drink'/'How likely would you be to allow him to buy you a drink?').

For the third vignette, the vacation scene, participants are told that they are on vacation by themselves and are on a day-long tour of a foreign city. They are told to imagine that they end up talking most of the day with a man who is on the same tour. They are to imagine themselves enjoying the company of the man, that the two have decided to have dinner together, and that they ultimately end up at the same hotel for the night. Participants then respond to eight items regarding hypothetical mating behaviours. Again, questions are posed in a proceptive manner (e.g., 'How likely would you be to initiate holding hands with him') and a receptive manner (e.g., 'How likely would you be to hold hands with him, if he initiated?'). Responses are rated on a Likert-type scale ranging from 1 (*not at all likely*) to 9 (*extremely likely*).

The three vignettes represent varied potential mating opportunities. The classroom scene represents the least sexually oriented scene, with items mostly reflecting early courtship behaviours that could be considered typical in most sexual relationships (e.g., friends-with-benefits relationships, short-term relationships, long-term relationships). The

vacation scene, by contrast, is much more short-term oriented in that participants are explicitly told that a long-term relationship with the man is not possible. It might also be considered more short-term oriented because the participant is told that no one would ever know of the encounter. This might lead participants to decrease their perceptions of risk (e.g., loss of reputation, rejection by female friends) associated with this situation. The nightclub scene is more ambiguous and represents potential for various relationships (e.g., short-term, friends-with-benefits, or long-term relationships), although any type of relationship could potentially ensue from any of the vignettes.

In order to take into account the wide range of mating opportunities that women might face, the PARMSS was scored by summing all proceptive and receptive items (respectively) across all three vignettes. Consequently, the PARMSS provides two scores: a total proceptive orientation score and a total receptive orientation score, which are the sums of the proceptive and receptive items across the three vignettes. Higher scores indicate more of a propensity towards the respective mating behaviours.

Procedure

Recruitment and screening. Participants were recruited from Introductory Psychology courses, upper year psychology courses, and through pamphlet, poster, and multimedia advertisements. When recruiting from courses, researchers followed a script describing the study in person or through multimedia advertisement (e.g., email; see Appendix J). The study was presented as examining women's person perception and dating behaviours. For in-person recruitment, the script was read and potential participants had the opportunity to obtain a screening questionnaire from the recruiter or to go to an internet link to fill out the questionnaire online through a secure website

(Survey Monkey). The class was also provided with the recruiter's email address in case they would rather receive the screening questionnaire via email. Appendix K contains the poster/multimedia advertisements that were used; the same information was presented on pamphlets that were distributed at a community event.

Potential participants read the letter to participants (see Appendix L) and signed (or indicated their consent if completing the online version) the screening consent form (see Appendix M) before completing the screening questionnaire. Following the screening questionnaire was the screening debriefing form (see Appendix N) with details about the next phase of the study. Potential participants completed the questionnaires on their own time and returned them to a drop-box in the psychology department mail room at their convenience (n = 78). Alternatively, many participants (n = 86) completed the screening questionnaire online. Those individuals who satisfied inclusion criteria (described above) were contacted by email or phone to participate in the study.

Laboratory sessions. At their first laboratory session, participants read the letter to participants (see Appendix O) and completed the laboratory consent form (see Appendix P) and any questions they had were answered. Participants completed the laboratory session in a small room either alone or together with other participants in the same room (up to three participants at one time, each at their own testing station with their own computer). Participants first completed the PARMSS-I followed by the PARMSS-P while assessing 35 pictures of men. After the picture-rating task, participants completed the laboratory questionnaires. All participants completed the demographics, the general relationship and sexuality questions, and remaining miscellaneous

questionnaires. Those participants who were in a romantic relationship also completed questionnaires specific to their current relationship.

Session two was scheduled to coincide with a different menstrual cycle phase but was scheduled for about the same time of day as was session one (within three hours), to control for possible effects of circadian and hormonal rhythms (e.g., Burger, 2002). The mean days between testing session was 23.15 (*SD* = 13.17 days, minimum days = 6, maximum days = 67). The procedure for the second laboratory session was identical to the first session. As in session one, participants first completed the PARMSS-I followed by the PARMSS-P while rating the same 35 photos of men. The laboratory questionnaire package was shortened however. Specifically, the questionnaire in the second laboratory session contained questions pertaining to important hormonal variables (i.e., pregnancy status, hormonal medication use). It also included the Romantic Partner Attribute Index, the Attitudes Towards Infidelity Scale, the Pinney Sexual Satisfaction Inventory (general sexual satisfaction scale), the Multidimensional Sociosexuality Inventory, the Self-Perceived Mating Success scale, the Self-Perceived Attractiveness scale, items from the SOI, as well as items relating to sexual behaviour in the previous three days. These measures were included to determine test retest reliabilities.

Partner status was queried at session two and if the participant indicated having a current partner, she was asked to complete the identical package as was completed at session one for participants in relationships (described above). After completing session two, participants were thanked for their participation, provided with a debriefing form (see Appendix Q), and any questions they had were addressed. To allow a reverse count confirmation for day of laboratory testing, participants reported back to the researcher by

email on the date of the beginning of the next menstrual cycle (i.e., day 1 of their menstrual bleeding).

Results and Discussion

Prior to examining the STMO and the PARMSS, data was screened for outliers and the participant sample was assessed to determine generalizability. Test-retest analyses were then performed for all measures administered at both sessions. Subsequently, the STMO and PARMSS were assessed in relation to each of the questionnaire sections described above: screening and reproductive/hormonal questions (these two sections were combined as they measured similar constructs), demographic questions, general sexuality questions, current relationship questions for those in a romantic relationship, and miscellaneous questions. Further data (e.g., intercorrelations between all measures) are provided in the tables although not discussed explicitly unless highly relevant to the STMO or PARMSS.

Data Screening

Data was screened for the presence of univariate and multivariate outliers. No standardized score exceeded Tabachnick and Fidell's (2001) recommended cut-off score of ±3.29. Furthermore, no multivariate outliers were detected using Mahalanobis distance ($p < .001$ criterion).

Sample Characteristics

In order to ensure generalizability, women who took part in the study (Participants; $n = 64$) were compared to those women who were eligible but did not participate (Eligible Non-Participants; $n = 26$). Groups were compared on items administered on the screening questionnaire. Although menstrual cycle information is not

typically included in psychometric instrument evaluations, hormonal variables such as these should be included as they provide increased confidence in the representativeness of the sample on items that are theoretically related to sexual or mating behaviours. Independent samples *t*-tests determined that participants did not differ from eligible non-participants on age, sexual orientation, age of menarche, menstrual cycle predictability, average length of menstrual cycle, religious attendance, or desire to avoid pregnancy at the current time. Chi-square tests also found that these groups did not differ in terms of whether they were currently in a relationship or whether they had ever been pregnant. The only significant difference found between these two groups was that eligible non-participants were more likely to have a history of oral contraceptive use than the participants ($X^2 = 4.35$, $p = .04$). Descriptive data on these variables and analyses are provided in Table 1.

Further comparisons were made between those women who completed both laboratory sessions and those who only completed one. The dropout rate for this study was similar to that of other research (e.g., Durante, Li, & Haselton, 2008; Gangestad, Thornhill, & Garver, 2002; Oinonen, 2004; Ostovich & Sabini, 2004; Pillsworth & Haselton, 2006); 18 out of 64 women (i.e., 28%) did not complete session two. Comparisons were made between women who completed both sessions and women who completed only one session to determine if there were any group differences. In addition to the variables compared between participants and eligible non-participants (above), scores on the Short-Term Mating Orientation (STMO) subscale from Jackson and Kirkpatrick's (2007) multidimensional scale of sociosexuality were also compared between women who completed both sessions (Completers) and those who only

Table 1

Comparisons Between Women Who Participated (Participants) and Women Who Were Eligible to Participate But Did Not (Eligible Non-Participants).

	Participants $n = 64$[a]	Eligible Non-Participants $n = 26$[b]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Age (years)	21.82 (6.13)	20.52 (3.15)	-1.32	.19
Sexual Orientation [c]	1.37 (0.86)	1.27 (0.83)	-0.50	.62
Age (in years) at Menarche	12.78 (1.59)	12.58 (1.65)	-0.53	.60
Menstrual Cycle Predictability [d]	3.69 (0.79)	3.85 (0.61)	1.02	.31
Average Length of Menstrual Cycle (in days)	28.30 (3.32)	29.08 (2.50)	1.20	.23
Religious Attendance [e]	6.95 (2.05)	6.58 (1.98)	-0.80	.43
Desire to Avoid Pregnancy at the Current Time [f]	6.74 (0.96)	6.56 (1.00)	-0.78	.44

		Participants $n = 64$[g]	Eligible Non-Participants $n = 26$		
		Frequency (%)	Frequency (%)	X^2	*p*
Previous use of OCs?	Yes	25 (41)	17 (65)	4.35	.04*
	No	36 (59)	9 (35)		
Currently in relationship?	Yes	31 (49)	13 (50)	.01	.95
	No	32 (51)	13 (50)		
Ever been pregnant?	Yes	6 (10)	6 (23)	2.79	.10
	No	56 (90)	20 (77)		

Note. OC = Oral Contraceptive.

[a] Actual *N*s ranged from 60 – 64 due to missing data. [b] Actual *N*s ranged from 25 – 26 due to missing data. [c] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*). [d] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [e] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 (*I never attend religious services*). [f] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [g] Actual *N*s ranged from 61 – 63 due to missing data.

* $p < .05$

completed one (Non-completers). Means, standard deviations, and comparison results are provided in Table 2. The only variable that differed significantly between these two groups was sexual orientation, in that women who completed both sessions reported higher levels of attraction to women compared to women who dropped out [$t(58) = 0.56$, $p = .046$]. This might suggest that the women who completed both sessions had a more variable or dynamic expression of sexuality than did the group of women who dropped out. However, both groups indicated an overall strong preference for men in terms of sexual orientation.

Test-Retest Reliabilities

Test-retest reliabilities and mean scores for all scales administered in both sessions are presented in Table 3. Average number of days between testing was 23.15 days (SD = 13.17 days, minimum days = 6, maximum days = 67). The drop-out rate was 28%, which is similar to that of other research (e.g., Ostovich & Sabini, 2004). All but one measure (Attitudes Towards Infidelity) demonstrated moderate test-retest reliability (i.e., higher than .70; Murphy & Davidshofer, 2004). The STMO showed high test-retest reliability, $r(45) = .92$, $p < .01$, as did the PARMSS-I proceptive and receptive scales, $r(45) = .76$, $p < .01$ and $r(45) = .78$, $p < .01$, respectively. These reliabilities may be underestimates since women were purposely assessed at different menstrual cycle phases and many variables related to women's mating orientation (e.g., commitment to partner; Jones et al., 2005) are known to fluctuate in non-random ways across the menstrual cycle. As such, it is likely that the test-retest reliabilities would be higher if both testing sessions had happened during the same phase of consecutive menstrual cycles. However, given that much research on test-retest reliability tends to use a one-week or two-week testing

Table 2

Comparisons Between Women Who Took Part in Both Sessions (Completers) and Women Who Dropped Out (Non-Completers).

		Completers $n = 46$ [a]	Non-Completers $n = 18$ [b]		
		M (*SD*)	*M* (*SD*)	*t*	*p*
Age (years)		22.07 (6.37)	21.17 (5.58)	0.56	.58
Sexual Orientation [c]		1.47 (0.98)	1.12 (0.33)	2.04*	.05
Age (in years) at Menarche		12.59 (1.50)	13.29 (1.80)	-1.47	.15
Menstrual Cycle Predictability [d]		3.74 (0.83)	3.56 (0.71)	0.89	.38
Average Length of Menstrual Cycle (in days)		28.50 (2.93)	27.76 (4.27)	0.66	.52
Religious Attendance [e]		7.02 (2.02)	6.76 (2.20)	0.42	.68
Desire to Avoid Pregnancy at the Current Time [f]		6.71 (1.10)	6.82 (0.04)	-0.60	.56
STMO [g]		2.88 (1.56)	2.81 (1.57)	-0.01	.93
		Completers $n = 46$ [h]	Non-Completers $n = 17$ [i]		
		Frequency (%)	Frequency (%)	X^2	*p*
Previous use of OCs?	Yes	16 (36)	9 (56)	2.09	.15
	No	29 (65)	7 (43)		
Currently in relationship?	Yes	23 (50)	8 (47)	.04	.84
	No	23 (50)	9 (53)		
Ever been pregnant?	Yes	4 (9)	2 (13)	0.20	.66
	No	42 (91)	14 (88)		

Note. STMO = Short-term Mating Orientation; OC = Oral Contraceptive
[a] Actual *N*s ranged from 43 – 46 due to missing data.[b] Actual *N*s ranged from 17 – 18 due to missing data. [c] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*). [d] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [e] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*).[f] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [g] Scores range from 1 to 7, with higher numbers indicating more preference towards short-term mating strategies. [h] Actual *N*s ranged from 45 – 46 due to missing data. [i] Actual *N*s ranged from 16 – 17 due to missing data.
* $p < .05$

Table 3

Test-retest [a] Reliabilities and Mean Scores for All Measures Administered at Both Sessions.

	Session 1	Session 2		
	M (*SD*)	*M* (*SD*)	*N*	*r*
PARMSS-I, Proceptive Score	4.09 (1.58)	4.15 (0.78)	45	.76**
PARMSS-I, Receptive Score	5.90 (1.61)	5.53 (1.75)	45	.78**
PARMSS-P, Proceptive Score	2.65 (1.13)	2.68 (1.22)	45	.88**
PARMSS-P, Receptive Score	3.65 (1.26)	3.34 (1.25)	45	.88**
STMO	2.80 (1.52)	2.99 (1.63)	45	.92**
LTMO	6.17 (1.11)	6.21 (0.86)	45	.79**
SOI	45.02(26.78)	42.54 (22.85)	32	.89**
RPAI – PQ	7.76 (0.91)	7.74 (0.84)	45	.73**
RPAI – SV	6.75 (1.37)	6.69 (1.38)	45	.76**
ATI	2.12 (0.71)	2.19 (0.90)	45	.61**
PSSI – General Satisfaction	4.50 (1.52)	4.25 (1.71)	30	.89**
SPMS	4.29 (1.22)	4.29 (1.27)	45	.90**
SPAS	4.24 (1.10)	4.27 (1.15)	45	.74**
RAS	4.05 (1.04)	4.12 (0.88)	19	.91**
ISS	3.96 (0.76)	4.06 (0.69)	15	.96**
Love Scale	6.97 (1.40)	7.05 (1.28)	19	.83**
PSSI – Satisfaction with Partner	5.12 (1.36)	4.90 (1.72)	15	.85**
RPAI – PQ Current Partner	7.94 (1.01)	8.01 (0.87)	19	.79**
RPAI – SV Current Partner	7.83 (0.97)	7.66 (1.02)	19	.75**
SPMS Current Partner	5.27 (1.22)	5.16 (1.11)	19	.95**

Note. PARMSS-I = Proceptive and Receptive Mating Strategies Scale – Imaginary; PARMSS-P = Proceptive and Receptive Mating Strategies Scale – Photo; STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; SOI = Sociosexual Orientation Index; RPAI – PQ = Romantic Partner Attribute Index – Parent Qualities subscale; RPAI – SV = Romantic Partner Attribute Index – Social Visibility subscale; ATI = Attitudes Towards Infidelity; PSSI = Pinney Sexual Satisfaction Inventory; SPMS = Self-perceived Mating Success; SPAS = Self-perceived Attractiveness Scale; RAS = Relationship Assessment Scale; ISS = Index of Sexual Satisfaction.

[a] Mean days between testing was 23.15 (SD = 13.17 days)

** $p < .01$

interval (e.g., Hudson, Harrison, & Crosscup, 1981; Mark et al., 2014; Renshaw et al., 2011), all such data would similarly underestimate the test-retest reliability of measures.

Reliability and Validity of the STMO and the PARMSS

Cronbach alphas for the MDSOI scales were .92 for STMO (n = 60), .91 for LTMO (n = 61), and .81 for PSB (n = 49), suggesting high internal consistency for these scales (Murphy & Davidshofer, 2004). Reliability analyses were performed for the Proceptive and Receptive Mating Strategy Scale (PARMSS) based on the data provided by all participants in the first session. Cronbach's alphas were also computed for the proceptive and receptive subscales for each scenario (i.e., the classroom scene, the nightclub scene, and the vacation scene). Cronbach's alpha was .92 for both the overall proceptive scale (n = 64) and the overall receptive scale (n = 63) (these two scales were the ones used in any further analyses below). In the classroom scene, Cronbach's alphas for the proceptive and receptive scales were each .70 (n = 64). For the nightclub scenario, Cronbach's alpha for the proceptive scale was .89 and .88 for the receptive scale (n = 64). For the vacation scenario, Cronbach's alpha was .88 for the prospective scale and .86 for the receptive scale (n = 64). This suggests a homogenous group of items for each of these scales.

Screening and reproductive/hormonal questions. In order to examine convergent and divergent validity of both the STMO and the PARMSS, correlational analyses were performed between these measures and the screening questions and the reproductive/hormonal questions. The STMO was negatively correlated with LTMO, $r(64) = -.25$, $p = .042$, which is contrary to the results by Jackson and Kirkpatrick (2007) who found the STMO to be unrelated to the LTMO. It is possible that women in our

sample (perhaps due to the young age of the sample) were subscribing more to one mating strategy than the other, whereas an older sample may be more likely to engage in dual-mating strategies.

The STMO was found to be positively correlated with the PSB, $r(64) = .55$, $p < .01$, suggesting that unrestricted women reported engaging in more sexual activities than restricted women. Neither the STMO nor the PARMSS-I were correlated with menstrual cycle variables nor with romantic orientation. However, higher scores on both the PARMSS-I (proceptive) and the PARMSS-P (proceptive) were related to a stronger sexual orientation towards women, $r(59) = .26$, $p = .043$, $r(59) = .36$, $p = .015$, respectively. This suggests that women with any amount of bisexuality may be more proceptive in terms of their mating behaviours with men. Higher scores on the STMO were also related to a lower desire to avoid pregnancy at the current time, $r(63) = -.30$, $p = .017$, and lower rates of attendance at religious ceremonies, $r(63) = -.39$, $p = .002$. These relationships are discussed further below.

Correlational analyses (see Table 4) revealed several significant relationships that support the validity of the PARMSS-I as a measure of proceptive and receptive mating strategies in new/potential relationships. First, the Proceptive and Receptive scales were highly correlated [$r(63) = .78$, $p < .01$] indicating that women who describe themselves as being more proceptive in their mating behaviours with men also generally describe themselves as being more receptive to the sexual/romantic advances of men. Further, the Proceptive and Receptive scores of the PARMSS-I were highly correlated with the Proceptive and Receptive scores of the PARMSS-P, suggesting that scores on the

Table 4

Intercorrelations among MDSOI, PARMSS, Screening Questions, and Reproductive/Hormonal Questions (N=64[a]).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. STMO	-															
2. LTMO	-.25*	-														
3. PSB	.55*	-.05	-													
4. PARMSS-I, Proc	.42**	-.15	.21	-												
5. PARMSS-I, Rec	.49**	-.12	.18	.78**	-											
6. PARMSS-P, Proc	.35*	-.13	.00	.76**	.56**	-										
7. PARMSS-P, Rec	.50**	-.02	.05	.70**	.72**	.86**	-									
8. Age	.14	.06	.38**	-.06	-.04	-.06	.25	-								
9. Avg. Lngt. Menst. Ccl	.04	.21	.19	.15	.14	.04	.12	.12	-							
10. Mens. Ccl. Predict.[b]	-.05	-.08	-.04	.04	.09	.11	.06	-.17*	-.48**	-						
11. Avg. Lng. of Mens.	-.19	.21	-.23	.06	.04	-.02	-.05	-.09	.32**	-.19*	-					
12. Age of Menarche	-.01	-.03	-.01	-.02	.02	-.08	.02	.01	-.12	-.07	-.12	-				
13. Desire to Avd. Preg.[c]	-.30*	-.06	-.23	.06	.20	.01	.07	-.16*	.15	.22**	-.08	.07	-			
14. Sexual Orientation[d]	.14	-.01	.15	.26*	.21	.36*	.34*	.00	.17*	-.18*	.13	-.07	-.01	-		
15. Romantic Orient.[e]	.19	-.09	.19	.27	.13	.37*	.34*	.05	.18*	-.20*	.07	-.06	-.07	.90**	-	
16. Religious Attend.[f]	-.39**	-.23	.32*	.04	.07	-.20	.02	.02	.01	.05	-.01	.04	.03	.10	.13	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS = Proceptive and Receptive Mating Strategies [a] Actual N ranged from 48-64 due to missing data [b] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [c] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy [d] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*) [e] Romantic orientation ranged from 1 (*only attracted to men*) to 9 (*only attracted to women*). [f] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*).

*$p < .05$ ** $p < .01$

PARMSS-I involving imagined men are related to women's mating behaviours in response to actual men (i.e., convergent validity).

The proceptive and receptive scales were examined in relation to the MDSOI. Results show that both the proceptive and receptive scores were positively correlated with the STMO [$r(60) = .42$, $p < .01$; $r(60) = .49$, $p < .01$, respectively], fully supporting Hypothesis 2. Demonstrating divergent validity, the PARMSS-I proceptive and receptive scales were not related to the LTMO [$r(60) = .15$, $p = .27$; $r(60) = .12$, $p = .36$, respectively]. Thus the proceptive and receptive scales within the PARMSS appear to be more related to women's short-term (rather than long-term) mating orientations. As the PARMSS was designed to measure mating and sexual behaviours in new or potential relationships, this result provides some evidence that the PARMSS provides information on behaviours and strategies specifically related to potential short-term relationships. The proceptive and receptive scales were not significantly related to Previous Sexual Behaviours [$r(52) = .21$, $p = .142$; $r(52) = .18$, $p = .198$, respectively].

The unrestricted and restricted STMO groups were then compared on items from the screening questionnaire and reproductive/hormonal variables (See Table 5). Restricted and unrestricted women were approximately the same age (21:0 compared to 22:4) and had similar menstrual cycle characteristics; they reported comparable average menstrual cycle lengths and cycle predictabilities, although unrestricted women reported a shorter average duration of menstruation (4.52 days) compared to restricted women (5.29 days), $t(60) = 2.29$, $p = .026$, and they were more likely to have used oral contraceptives in the past, $X^2(60) = 4.44$, $p = .04$. Restricted and unrestricted

Table 5

Screening Questionnaire Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short Term Mating Orientation Scores.

	Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
	M (*SD*)	*M* (*SD*)	*T*	*p*
Age (in months)	252.00 (80.63)	268.42 (66.20)	-0.88	.38
Average Length of Menstrual Cycle (in days)	28.26 (3.88)	28.32 (2.77)	-0.08	.94
Menstrual Cycle Predictable [b]	3.75 (0.95)	3.65 (0.61)	0.52	.61
Average Length of Menstruation (in days)	5.29 (1.53)	4.52 (1.09)	2.29	.026*
Age (in years) of Menarche	12.77 (1.75)	12.71 (1.42)	0.16	.87
Desire to Avoid Pregnancy at the Current Time [c]	7.00 (0.00)	6.52 (1.31)	2.05	.048*
Sexual Orientation [d]	1.26 (0.77)	1.50 (0.96)	-1.06	.30
Romantic Orientation [e]	1.30 (1.02)	1.97 (1.25)	-2.27	.027*
Religious Attendance [f]	6.17 (2.35)	7.68 (1.42)	-3.03	.004*

		Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
		Frequency (%)	Frequency (%)	X^2	*p*
Ever used OCs?	Yes	8 (27)	16 (53)	4.44	.04
	No	22 (73)	14 (47)		
Ever been pregnant?	Yes	2 (6)	3 (10)	0.26	.61
	No	29 (94)	27 (90)		
Have kids ?	Yes	1 (3)	1 (3)	0.00	1.0
	No	30 (97)	30 (97)		
Currently in relationship?	Yes	17 (55)	13 (42)	1.03	.31
	No	14 (45)	18 (58)		

[a] Actual *N*s ranged from 28-32 due to missing data. [b] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [c] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [f] Scores range from 1 (*every day*) to 9 (never). [d] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*) [e] Romantic orientation ranged from 1 (*only attracted to men*) to 9 (*only attracted to women*). [f] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*).
* $p < .05$

women reported being about the same age at menarche and having the same number of pregnancies/children. Although previous research has suggested that early menarche could be indicative of alternative or conditional mating strategies in women (e.g., Gillette & Folinsbee, 2012), this lack of difference could be due to the relatively young age of the present sample.

Women in this sample were queried about their current desire to avoid pregnancy as a measure of their conscious or explicit mating strategy. Restricted women reported a higher desire to avoid pregnancy at the current time than did unrestricted women, $t(59) = 2.02$, $p = .048$. Moreover, restricted women in this sample were entirely homogenous, with every woman reporting a 100% desire to avoid pregnancy. This was not related to partner status as restricted and unrestricted women were equally likely to be involved in a relationship, $X^2(62) = 1.03$, $p = .31$. While it may initially seem inconsistent with evolutionary principles, it is possible that a stronger aversion to pregnancy could in part facilitate the restricted strategy.

Sexual orientation (i.e., ranging from 'exclusively heterosexual' to 'exclusively homosexual') and romantic orientation (i.e., ranging from 'only attracted to men' to 'only attracted to women') were assessed. Although sexual orientation and romantic orientation may be thought of as essentially measuring the same construct, romantic orientation was included as a separate item because it could represent further variation in mating tactics. Moreover, the current findings suggest that when women are given more options to describe their sexuality (e.g., by having a nine-point scale rather than a dichotomous choice to rate sexual orientation), women report more heterogeneous preferences. Although restricted and unrestricted women in this sample did not differ in their reported

sexual orientation, unrestricted women in this sample reported significantly more romantic attraction to women than did restricted women, $t(58) = -2.27$, $p = .027$. This suggests that unrestricted women may have more variable or dynamic mating strategies than do restricted women.

Religious affiliation was also assessed to explore its relation to STMO. Previous research in this area has been mixed; some research has demonstrated that sexual permissiveness is negatively related to religiosity (e.g., Kardum, Gracinin, Hudek-Knesvic, 2008). Other related research has shown that religiosity does not predict infidelity (e.g., Mark, Janssen, & Milhausen, 2011) and that state-level religiosity and conservatism are positively related to web searches for sexual content (MacInnis & Hodson, 2015). Data from this study support the former research findings; restricted women reported more frequent attendance at religious ceremonies than did unrestricted women, $t(59) = -3.03$, $p = .004$, suggesting that a short-term mating orientation is associated with lower levels of religious affiliation.

Demographic questions. Correlational analyses were performed between the MDSOI, the PARMSS, and the remaining demographic variables from the lab sessions (see Table 6). The STMO was negatively related to paternal educational attainment, $r(62) = -.283$, $p = .026$, and the PARMSS-I (receptive) was negatively correlated with participants' own level of educational attainment, $r(61) = -.258$, $p = .045$. No other correlations were significant for the remaining demographic items.

Basic demographic information was then compared between restricted and unrestricted women (see Table 7). Unrestricted and restricted women were equivalent in

Table 6

Intercorrelations between MDSOI, PARMSS, and the Remaining Demographic Items ($N = 64$[a]).

	1	2	3	4	5	6	7	8	9	10	11
1. STMO	-										
2. LTMO	-.25*	-									
3. PSB	.55*	-.05	-								
4. PARMSS-I, Proceptive	.42**	-.15	.21	-							
5. PARMSS-I, Receptive	.49**	-.12	.18	.78**	-						
6. PARMSS-P, Proceptive	.35*	-.13	.00	.76**	.56**	-					
7. PARMSS-P, Receptive	.50**	-.02	.05	.70**	.72**	.86**	-				
8. Mother's Years of Education	-.13	-.09	-.26	.02	-.20	.26	.08	-			
9. Father's Years of Education	-.28*	.00	-.27	.08	-.10	.12	.01	.45**	-		
10. Participant's Years of Education	.01	-.03	.25	-.06	-.26*	.08	-.03	.35**	.06	-	
11. Body Mass Index	.22	-.01	.16	.08	.00	.32*	.27	.03	-.31*	.34**	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS = Proceptive and Receptive Mating Strategies
[a] Actual N ranged from 48-64 due to missing
* $p < .05$ ** $p < .01$

Table 7

Demographic Variable Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short-Term Mating Orientation Scores.

	Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Mother's Years of Education	6.06 (1.59)	5.50 (1.66)	1.37	.18
Father's Years of Education	6.30 (2.01)	4.93 (2.45)	2.34	.02*
Participant's Years of Education	7.03 (0.18)	7.00 (0.95)	0.19	.85
Body Mass Index	23.19 (4.94)	25.69 (5.97)	-1.75	.09

[a] Actual *N*s ranged from 29-32 due to missing data.
* $p < .05$

their educational attainment, possibly because this sample was composed primarily of undergraduate students. Although the educational attainment of their mothers was similar, restricted women reported more highly educated fathers than did unrestricted women, $t(57) = 2.34$, $p = .02$. Previous research has suggested that parental social status of both the mother and father predicted intra-sexual competition in young women (Buunk & Stulp, 2014), but these results suggest that only fathers' educational status is related to women's short-term orientation (i.e., short-term orientations are more common in women with low paternal education).

Restricted women reported a trend towards lower (and more sexually appealing; Tovee, Reinhardt, Emery, & Cornelissen, 1998) self-reported BMI scores (23.19) than did unrestricted women (25.69) but this difference did not reach statistical significance, $t(58) = -1.77$, $p = .082$.

General relationship questions. Correlational analyses were performed between the MDSOI, the PARMSS, and the general relationship variables assessed (see Table 8). The STMO was positively related to number of previous romantic relationships, $r(63) = .31$, $p = .014$, while PSB was positively related to the length of the longest previous relationship, $r(56) = .28$, $p = .035$. The proceptive and receptive scales were not related to the Attitudes Towards Infidelity scale [$r(60) = .15$, $p = .244$; $r(60) = .06$, $p = .648$, respectively], suggesting that attitudes towards infidelity are unrelated to whether one engages in many or few proceptive and receptive mating behaviours. The PARMSS-I and PARMSS-P measures were not significantly correlated with any of these general relationship variables.

Table 8

Intercorrelations between MDSOI, PARMSS, and General Relationship Variables ($N = 64$[a]).

	1	2	3	4	5	6	7	8	9	10	11	12
1. STMO	-											
2. LTMO	-.25*	-										
3. PSB	.55*	-.05	-									
4. PARMSS-I, Proceptive	.42**	-.15	.21	-								
5. PARMSS-I, Receptive	.49**	-.12	.18	.78**	-							
6. PARMSS-P, Proceptive	.35*	-.13	.00	.76**	.56**	-						
7. PARMSS-P, Receptive	.50**	-.02	.05	.70**	.72**	.86**	-					
8. Number of Relationships	.31*	.08	.49**	-.05	-.03	-.19	-.08	-				
9. Length of Longest Relationship (in months)	.08	.11	.28*	-.14	-.15	-.06	-.15	.60**	-			
10. RPAI–Desire for Parenting Quality	.05	.37**	.12	.12	.09	.14	.10	.06	.21	-		
11. RPAI–Desire for Social Visibility	.21	.23	.10	.23	.04	.24	.06	.05	.26*	.43**	-	
12. Attitudes Towards Infidelity	.10	-.24	.23	.15	.06	.11	.12	-.05	-.22	-.16	-.14	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS = Proceptive and Receptive Mating Strategies; RPAI = Romantic Partner Attribute Index [a] Actual N ranged from 48-64 due to missing

* $p < .05$ ** $p < .01$

Unrestricted and restricted women were then compared on the general relationship variables (see Table 9). Providing some support for previous research indicating that unrestricted women engage in more sexual behaviours (e.g., Peterson, Geher, & Kaufman, 2011), unrestricted women in this sample reported more previous romantic relationships with men than did restricted women, $t(58) = -2.29$, $p = .029$ although the length of their longest relationships did not differ and they were equally likely to have previously cohabitated. They were also equally (un)likely to have been divorced, although given the age of the sample it is perhaps not surprising that groups did not differ on this variable since most women had not even been married; this comparison may not be valid in a group of young (mostly unmarried) women.

Contrary to previous research, restricted and unrestricted women in this sample did not differ in their preferences for romantic partners in that women overall reported similar desires for romantic partners who possessed parenting qualities and social visibility as measured by the RPAI, which did not support Hypothesis 1. The correlational analysis above further suggested that LTMO was related to a desire for parenting qualities in a partner. Other research (e.g., Provost et al., 2006; Simpson & Gangestad, 1992) has found that unrestricted women tend to prefer traits associated with social visibility. While the lack of a relationship between STMO and desire for socially visible partners does not necessarily cause problems for the convergent validity of the STMO measure, it does conflict with some past hypotheses and findings in the area about unrestricted sociosexuality. Taken together with the correlational findings above, the present findings suggest that higher long-term mating orientation is associated with greater desire for a partner with high parenting qualities, but that no links exist between

Table 9
General Relationship Variables Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short Term Mating Orientation Scores.

	Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Number of Relationships	1.06 (1.21)	1.93 (1.67)	-2.29	.03*
Length of Longest Relationship (in months)	20.04 (28.61)	24.28 (22.56)	-0.65	.52
RPAI – Desire for Parenting Quality [b]	7.74 (1.08)	7.78 (0.71)	-0.16	.87
RPAI – Desire for Social Visibility [b]	6.70 (1.26)	6.81 (1.50)	-0.32	.75
Attitudes Towards Infidelity [c]	2.07 (0.76)	2.17 (0.67)	-0.55	.59

		Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
		Frequency (%)	Frequency (%)	X^2	*p*
Ever been divorced?	Yes	1 (3)	0 (0)	0.98	.32
	No	30 (97)	30 (100)		
Ever co-habitated?	Yes	2 (6)	6 (20)	2.61	.11
	No	30 (94)	24 (80)		

Note: RPAI = Romantic Partner Attribute Index
[a] Actual *N*s ranged from 29-32 due to missing data. [b] Scores ranged from 1 (*not at all important*) to 9 (*extremely important*) scores. [c] Scores ranged from 1 to 7 with higher scores reflecting greater endorsement of infidelity.
* $p < .05$

one's short-term mating orientation and desire for a socially visible partner or a partner high in parenting qualities.

Restricted and unrestricted women demonstrated comparable scores in their attitudes towards infidelity, which is in line with previous research suggesting that sociosexuality is not associated with reactions to infidelity (Harris, 2003). Regardless of sociosexual orientation, women in general reported negative attitudes towards infidelity.

General sexuality questions. Correlational analyses were conducted to examine the relationship of the STMO and the PARMSS to other variables associated with sexual attitudes and behaviours. The validity of STMO as a grouping variable (i.e., low vs. high short-term mating orientation) was also examined. As mentioned, groups were created by using a median split of STMO scores.

Correlational analyses were performed between the MDSOI, the PARMSS, and the general sexuality questions (see Table 10). As was found by Jackson and Kirkpatrick (2007), STMO and PSB were related to Simpson and Gangestad's (1991) SOI, $r(46) = .739$, $p < .01$ and $r(45) = .816$, $p < .01$ (respectively), but the SOI was not related to LTMO, $r(45) = -.084$, $p = .580$. The STMO was related to general sexual satisfaction as measured by the PSSI, $r(41) = -.380$, $p = .014$, suggesting that unrestrictedness was related to lower levels of sexual satisfaction (regardless of relationship status). STMO was not related to age at first sex or length of dating/knowing their partner before sex. However, STMO was related to number of mixed-sex partners (but not same-sex partners). The STMO was related to frequency of masturbation, $r(53) = .332$, $p = .015$ but unrelated to frequency or ease of orgasm during masturbation or sexual interactions with a partner.

Table 10

Intercorrelations between MDSOI, PARMSS, and General Sexuality Questions ($N = 64$[a])

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. STMO	-																					
2. LTMO	-.25*	-																				
3. PSB	.55*	-.05	-																			
4. PARMSS-I, Proceptive	.42**	-.15	.21	-																		
5. PARMSS-I, Receptive	.49**	-.12	.18	.78**	-																	
6. PARMSS-P, Proceptive	.35*	-.13	.00	.76**	.56**	-																
7. PARMSS-P, Receptive	.50**	-.02	.05	.70**	.72**	.86**	-															
8. SOI	.74**	-.08	.82**	.32*	.33*	.35*	.40*	-														
9. PSSI-General Sexual Satisfaction	-.38*	.17	-.32	-.27	-.32*	-.09	-.15	-.46**	-													
10. Age of first intercourse	-.06	-.12	-.21	.25	.09	.29	.04	.04	-.30	-												
11. Time dated partner before first intercourse	-.20	-.10	-.15	-.13	.02	-.14	-.21	-.12	-.09	.05	-											
12. Time knew partner before first intercourse	-.09	.19	-.13	-.23	-.08	-.25	-.09	-.11	-.03	-.14	.14	-										
13. # of intercourse partners	.51**	.03	.89**	.16	.11	-.04	.03	.67**	-.40	-.19	-.13	-.07	-									
14. # of fellatio partners	.35*	.06	.73**	.23	.14	.00	.07	.57**	-.39*	-.18	-.16	-.08	.91**	-								
15. # of mixed-sex oral partners	.42**	.08	.79**	.16	.07	-.09	-.02	.69**	-.40*	-.18	-.13	-.03	.89**	.92**	-							
16. # of same-sex oral partners	.00	-.15	.06	.18	-.06	.32	.12	.08	-.03	.23	.02	-.08	.03	-.04	-.05	-						

Table 10 Continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
17. Masturbation frequency	.33*	.19	.23	.13	.02	.20	.10	.43**	-.20	.14	-.11	.01	.28*	.13	.21	.36*	-					
18. Frequency of orgasm during masturbation	.22	.29	.23	.10	-.01	.13	.13	.31	.07	.03	-.29	.09	.21	.08	.19	.22	.72**	-				
19. Ease of orgasm during masturbation	.06	.37*	.04	.10	-.07	.08	.04	.16	.19	.04	-.27	-.02	.03	-.05	.07	.28	.57**	.89**	-			
20. Frequency of orgasm with partner	-.19	.22	.05	-.20	-.29	-.03	-.22	-.16	.52**	-.10	-.04	-.06	-.03	-.17	-.18	.04	.07	.23	.18	-		
21. Ease of orgasm with partner	-.18	.32*	-.11	-.22	-.33	-.13	-.32	-.21	.67**	-.24	.02	.08	-.18	-.31	-.26	.02	.10	.24	.42*	.76**	-	
22. Frequency of faking orgasm with partner	.14	-.45**	.08	.00	.05	-.09	-.09	.16	-.45**	.17	.03	.15	.09	.06	.12	.19	.19	-.11	-.05	-.24	.15	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS = Proceptive and Receptive Mating Strategies Scale; SOI = Sociosexual Orientation Index; PSSI = Pinney Sexual Satisfaction Index [a] Actual N ranged from 48-64 due to missing
* $p < .05$ ** $p < .01$

The PARMSS-I proceptive and receptive scales were related to Simpson and Gangestad's (1991) measure of SOI [$r(45) = .32$, $p = .034$; $r(45) = .33$, $p = .025$, respectively]. The proceptive and receptive scales were not related to masturbation frequency [$r(50) = .13$, $p = .372$; $r(50) = .02$, $p = .867$, respectively], suggesting that these scales are measuring something other than sex drive. This provides divergent validity for the PARMSS.-I. While the PARMSS-I proceptive scale was not related to a history of infidelity [$r(51) = .11$, $p = .46$], the receptive scale was positively associated [$r(51) = .34$, $p = .016$]. Thus, women with higher receptive scores were more likely to have cheated on a previous romantic partner. This fits with previous research suggesting that when a woman is the passive player she is more likely to engage in extra-pair sexual activities (see experiment 1 in Seal, Agostinelli, & Hannett, 1994). These results provide support for the validity of the newly developed PARMSS.

Analyses were then performed to determine the validity of using the STMO as a grouping variable (see Table 11). It was found that restricted (M = 1.62; SD = 0.49) and unrestricted (M = 4.05; SD = 1.24) women were significantly different on the STMO, $t(59) = -9.87$, $p < .01$ (as expected) providing initial validation for using the STMO as a grouping variable with this sample of women. The fact that the two groups differed significantly in terms of their short-term mating orientation allows us to further examine the validity of the STMO using these two groups of women. The restricted (M = 30.30; SD = 13.80) and unrestricted women (M = 56.35; SD = 28.97) were similarly distinct on Simpson and Gangestad's (1991) SOI, $t(44) = -4.03$, $p < .01$, providing further validity of the STMO as a measure of sociosexual orientation. As would be expected based on Jackson and Kirkpatrick's (2007) research, restricted and unrestricted women in this

Table 11
General Sexuality Questionnaire Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short-Term Mating Orientation Scores.

	Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
STMO	1.62 (0.49)	4.05 (1.24)	-9.87	<.01*
LTMO	6.49 (0.81)	5.95 (1.26)	1.96	.06
PSB	-1.09 (1.00)	0.91 (2.88)	-3.35	<.01*
SOI	30.30 (13.80)	56.35 (28.97)	-4.03	<.01*
PSSI – General Sexual Satisfaction	4.99 (1.48)	4.22 (1.50)	1.61	.12
Age (in years) of first intercourse	17.07 (2.15)	16.5 (1.30)	0.99	.37
Time dated partner before first intercourse (in days)	256 (266)	168 (201)	1.09	.29
Time knew partner before first intercourse (in days)	777 (421)	761 (1225)	0.05	.96
Number of intercourse partners	1.29 (2.15)	5.57 (6.57)	-3.29	<.01*
Number of fellatio partners	2.38 (2.78)	6.87 (7.16)	-2.73	<.01*
Number of mixed-sex cunnilingus partners	1.65 (2.37)	5.43 (6.24)	-2.66	<.01*
Number of same-sex cunnilingus partners	0.25 (0.58)	0.26 (0.54)	0.18	.86
Masturbation frequency [b]	2.72 (2.03)	3.27 (1.78)	-1.03	.31
Frequency of orgasm during masturbation [c]	4.61 (3.53)	5.13 (3.47)	-0.47	.64
Ease of orgasm during masturbation [d]	4.82 (2.72)	4.91 (2.51)	-0.10	.92
Frequency of orgasm with partner [c1]	4.94 (2.46)	4.23 (2.69)	0.84	.40
Ease of orgasm with partner [d]	4.94 (1.91)	4.71 (1.98)	0.35	.73
Frequency of faking orgasm with partner [e]	2.06 (2.54)	3.48 (2.54)	-1.68	.10

		Restricted $n = 32$ [a]	Unrestricted $n = 31$ [a]		
		Frequency (%)	Frequency (%)	X^2	*p*
Ever had sex?	Yes	15 (47)	22 (76)	5.36	.02*
	No	17 (53)	7 (24)		
Ever cheated?	Yes	3 (12)	10 (37)	4.34	.04*
	No	22 (88)	17 (63)		

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; SOI -= Sociosexual Orientation; PSSI = Pinney Sexual Satisfaction Index.
[a] Actual *N*s ranged from 15-32 due to missing data. [b] Scores ranged from 1 (*never*) to 9 (every day) scores. [c] Scores ranged from 0 (0%) to 8 (100%). [d] Scores ranged from 0 (*extremely difficult*) to 8 (*extremely easy*). [e] Scores ranged from 0 (*never*) to 8 (*always*).
* $p < .05$

sample did not differ on their LTMO scores, $t(59) = 2.00$, $p = .056$, although the p value nearly reached significance in this comparison. This result could be partly due to the sample; for example, the sample is young and restricted women were more likely than unrestricted women to be virgins, $X^2(61) = 5.36$, $p = .023$, perhaps suggesting that women in this sample were currently subscribing to one mating strategy over the other. It may be that older women would use more of a mixed strategy.

The STMO was related to many aspects of sexual behaviour. Unrestricted women reported more sexual partners across a variety of sexual behaviours with men and overall scored higher than restricted women on previous sexual behaviours (PSB), $t(51) = -3.35$, $p < .01$. These results generally mirror those found by Peterson, Geher, and Kaufman (2011), who found that sociosexuality in women was related to performing and receiving oral sex and preferences for vaginal sex although this sample did not differ in frequency of masturbation. Although restricted and unrestricted women did not differ in their attitudes towards, unrestricted women were more likely to have cheated on a romantic partner, $X^2(52) = 4.34$, $p = .038$, supporting research indicating that unrestricted sociosexuality is related to significantly more willingness to cheat on romantic partners (e.g., Seal, Agostinelli, & Hannett, 1994).

Restricted and unrestricted women (STMO groups) were further compared on the remaining items/scales making up the general sexuality questionnaire. Many variables did not differ between restricted and unrestricted women. Women reported similar ages of first sexual intercourse, and sociosexuality was not related to how long women knew or dated their first sex partner prior to intercourse. Sociosexuality was also not related to number of same-sex partners.

Further supporting previous research suggesting that sociosexuality is distinct from sex drive (Ostovich & Sabini, 2004; Simpson & Gangestad, 1991), this study found that STMO was not related to many sex-drive factors including frequency of masturbation or frequency/ease of orgasm with partner/during masturbation. It was also not related to the general sexual satisfaction subscale of the PSSI, suggesting that restricted and unrestricted women in this sample were comparable in terms of overall satisfaction with their current sex lives.

Current relationship questions (only for participants currently in a romantic relationship). Correlational analyses were performed between the MDSOI, the PARMSS, and the items assessing current romantic relationships (see Table 12). The STMO was unrelated to any of the items/scales measuring romantic relationship variables. Proceptive and receptive scores (for both versions of the PARMSS) were negatively related to the RAS suggesting that both proceptivity and receptivity are related to lowered relationship quality for the current relationship.

Restricted and unrestricted women who were currently in a romantic relationship were then compared (see Table 13). All of the unrestricted women reported having had sex with their current partner (compared to 65% of restricted women) although group differences did not reach statistical significance, $X^2(25) = 3.72$, $p = .054$. Unrestricted and restricted women had relationships that were of about the same duration and they reported having knowing/dating their partners for about the same amount of time before first having sex with them. This finding is contrary to what would be predicted based on findings by Simpson and Gangestad (1991), who reported that unrestricted sociosexuality was related to having sex sooner in the relationship.

Table 12

Intercorrelations between MDSOI, PARMSS, and relationship variables (for those participants currently in a relationship) ($N = 64$ [a]).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. STMO	-																
2. LTMO	-.25*	-															
3. PSB	.55*	-.05	-														
4. PARMSS-I, Proceptive	.42**	-.15	.21	-													
5. PARMSS-I, Receptive	.49**	-.12	.18	.78**	-												
6. PARMSS-P, Proceptive	.35*	-.13	.00	.76**	.56**	-											
7. PARMSS-P, Receptive	.50**	-.02	.05	.70**	.72**	.86**	-										
8. Length of current relationship	.43	-.13	.55*	.08	.01	.40	.34	-									
9. Months dated current partner before intercourse	-.13	.14	-.46*	.10	.08	-.06	-.16	.06	-								
10. Months knew current partner before intercourse	.10	.32	.11	.02	.24	-.05	.17	.08	.08	-							
11. RAS	-.15	.45*	-.45*	-.44*	-.54**	-.64**	-.54*	-.13	.34	.01	-						
12. ISSS	-.31	.39	-.42	.01	-.15	-.28	-.28	-.13	.29	-.12	.65**	-					
13. Love Scale	-.10	.64**	-.23	.12	-.10	-.11	.03	-.19	.23	.09	.68**	.61**	-				
14. PSSI –Sexual Satisfaction with partner	-.27	.13	-.34	.17	.04	-.09	-.05	-.23	.34	-.18	.45*	.80**	.47*	-			
15. Current Partner's Parenting Qualities	-.29	.46*	-.39*	.08	-.22	-.12	-.25	-.33	.17	-.25	.59**	.58**	.64**	.45*	-		
16. Current Partner's Social Visibility	-.34	.44*	-.12	.16	.02	.01	-.27	-.05	.20	-.09	.27	.43	.16	.16	.57**	-	
17. Current Partner's Mate Quality	.07	.02	-.16	.06	-.09	.03	-.15	.02	.25	.39	.02	.04	-.12	0.21	-.03	.13	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS = Proceptive and Receptive Mating Strategies Scales; RAS = Relationship Assessment Scale; ISSS = Index of Sexual Satisfaction Scale; PSSI = Pinney Sexual Satisfaction Index.

[a] Actual Ns ranged from 20 – 64 due to missing data.

* p = < .05, ** *p* = < .01

Table 13

Relationship Quality Questionnaire Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short-Term Mating Orientation (Only Women Currently in Romantic Relationships).

	Restricted $n = 17$ [a]	Unrestricted $n = 10$ [b]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Length of current relationship (in months)	18.92 (20.93)	43.33 (34.21)	-1.61	.15
Months dated current partner before intercourse	6.00 (6.81)	3.51 (8.33)	0.69	.50
Months knew current partner before intercourse	29.27 (21.02)	34.79 (47.30)	-0.29	.78
RAS [c]	4.23 (0.98)	3.73 (1.15)	1.10	.29
ISSS [d]	4. 05 (0.78)	3.86 (0.78)	0.56	.58
Love Scale [e]	6.98 (1.62)	6.83 (1.02)	0.29	.77
PSSI –Sexual Satisfaction with partner [f]	5.41 (1.48)	4.73 (1.14)	1.19	.25
Current Partner's Parenting Qualities [g]	8.15 (0.95)	7.53 (1.10)	1.43	.17
Current Partner's Social Visibility [h]	8.04 (0.87)	7.58 (1.08)	1.10	.29
Current Partner Mate Quality [i]	5.19 (1.19)	5.46 (1.38)	-0.49	.63

		Restricted $n = 17$ [a]	Unrestricted $n = 10$ [b]		
		Frequency (%)	Frequency (%)	X^2	*p*
Sex with current partner?	Yes	11 (65)	8 (100)	3.72	.05
	No	6 (35)	0 (0)		
Cheated on current partner?	Yes	1 (6)	1 (10)	0.16	.69
	No	16 (94)	9 (90)		

Note: RAS = Relationship Assessment Scale; ISSS = Index of Sexual Satisfaction Scale; PSSI = Pinney Sexual Satisfaction Index

[a] Actual *N*s ranged from 11-17 due to missing data. [b] Actual *N*s ranged from 6-10 due to missing data. [c] Higher scores reflecting higher relationship quality. [d] Higher scores reflect greater sexual satisfaction. [e] Higher scores reflect greater feelings of love. [f] Higher scores reflect greater sexual satisfaction within the relationship. [g] Higher scores reflect higher endorsement of parenting qualities. [h] Higher scores reflect higher endorsement of social visibility. [i] Higher scores reflect higher perceived mate quality for partner.

Surprisingly, none of the relationship variables were statistically different between restricted and unrestricted women. Measures of relationship quality, love, sexual satisfaction within the relationship, and history of infidelity (in the current relationship) were not different as a function of sociosexual orientation. This is contrary to previous research that has indicated that unrestrictedness is related to lower levels of commitment to romantic partners (e.g., Barta & Kiene, 2005; Hackathorn & Brantley, 2014; Mattingly et al., 2011; Ostovich & Sabini, 2004). However, some research has also failed to find differences in relationship quality as a function of sociosexuality (e.g., Hebl & Kashy, 1995) and results from the present study found that many important relationship assessment variables were unrelated to STMO. It is possible that LTMO is related to these constructs, as many important relationship variables were found to be related to the LTMO in the present study. Given the difficulties of previous definitions of sociosexuality (e.g., studies that used the SOI, which measures short-term mating strategies and long-term mating strategies along a single continuum), previous research may not have been as sensitive to short-term mating orientations in particular.

Inconsistent with previous research, unrestricted women in this sample did not appear to perceive their partners as significantly different from the way that restricted women viewed their partners. Research on ideal qualities has suggested that unrestricted women tend to place a heavier emphasis on social visibility as compared to restricted women who tend to value parenting qualities (e.g., Simpson & Gangestad, 1991). However, research on actual qualities that women perceive in their partners has not been consistent. For example, Hakathorn and Brantley (2014) recently found that, although unrestricted sociosexuality was related to higher ratings of one's current partner's social

status, it was negatively related to other important partner attributes that fit within social visibility (e.g., physical attractiveness). The authors proposed the possibility that although unrestricted women may desire certain characteristics, they may not always partner with such men. Conversely, the authors proposed that unrestricted sociosexuality may be related to a tendency to devalue one's partner, which could thereby lead to lower levels of commitment and higher rates of infidelity. The results from Study 1, however, indicate that STMO was not related to women's rating of their partners' attributes. Short-term mating orientation was not related to women's perceived importance of social visibility or mate quality (typically important to unrestricted women) or to parenting qualities (typically important to restricted women), although the LTMO was significantly related to partner preferences.

Miscellaneous variables. Finally, correlational analyses were performed on the miscellaneous variables, including numerous variables that have previously been found to be related to sociosexual orientation or short-term mating strategies (see Table 14). Neither the MDSOI nor the PARMSS correlated with any of the big five factors of personality, any of the BES scales, or the measures of self-perceived attractiveness/mating success scores. However, STMO was inversely related to social desirability, $r(64) = -.398$, $p = .001$, and all three scales of the MDSOI were significantly inversely correlated with women's reports that their religious beliefs affect their sexual values and behaviour.

Restricted and unrestricted women were then compared on these variables (see Table 15). Previous research has found sociosexuality to be related to the Big 5 personality factors (e.g., Berg et al., 2013; Eysenck, 1976; Holtzman & Strube, 2013;

Table 14

Intercorrelations between MDSOI, PARMSS, and Miscellaneous Variables ($N = 64$[a]).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. STMO	-																			
2. LTMO	-.25*	-																		
3. PSB	.55*	-.05	-																	
4. PARMSS-I, Proceptive	.42**	-.15	.21	-																
5. PARMSS-I, Receptive	.49**	-.12	.18	.78**	-															
6. PARMSS-P, Proceptive	.35*	-.13	.00	.76**	.56**	-														
7. PARMSS-P, Receptive	.50**	-.02	.05	.70**	.72**	.86**	-													
8. Extraversion	.13	-.02	.24	.21	.24	.12	.12	-												
9. Agreeableness	-.05	.19	-.14	.14	.20	.14	.26	.05	-											
10. Conscientiousness	-.04	.13	-.13	.15	.11	.11	.12	-.12	.43**	-										
11. Neuroticism	.02	.09	.12	-.12	.05	.06	-.02	-.16	.33**	-.05	-									
12. Openness	-.06	.02	-.06	-.08	-.12	.11	.03	.15	.18	.26*	.25*	-								
13. SPAS	.03	.09	.17	.20	.23	-.04	-.06	.32*	.11	.11	-.21	.00	-							
14. SPMSS	.04	-.03	.12	.20	.23	-.13	-.12	.29*	.11	.04	-.23	-.22	.70**	-						
15. BES – Sexual Attractiveness	-.07	.09	-.05	.23	.13	.21	.17	.30*	.14	.15	-.35**	-.03	.36**	.41**	-					
16. BES – Weight Concern	-.25	-.01	-.02	.04	.07	-.03	-.07	.29*	.09	.02	-.38**	-.04	.49**	.44**	.58**	-				
17. BES – Physical Condition	-.09	.03	.03	.10	.14	.12	.13	.50**	.11	.02	-.33**	.05	.37**	.41**	.54**	.73**	-			
18. SDS	-.40**	.16	-.13	-.02	-.05	.00	-.06	-.31*	.43**	.27*	-.33**	-.18	.04	.12	.29*	.28*	.09	-		
19. Religious Beliefs on Sexual Behaviours	-.44**	.29*	-.31*	-.14	-.07	.02	-.11	-.15	.10	.30*	.10	.14	.09	-.01	-.01	.07	.00	.12	-	
20. Religious Beliefs on Sexual Attitudes	-.45**	.29*	-.29*	.16	-.09	-.06	-.16	-.17	.08	.31*	.13	.13	.08	.01	-.02	.07	-.02	.16	.93**	-

Note: STMO = Short-Term Mating Orientation; LTMO = Long-Term Mating Orientation; PSB = Previous Sexual Behaviors; PARMSS-I = Proceptive and Rective Mating Strategies Scale-Imaginary; PARMSS-P = Proceptive and Receptive Mating Strategies Scale-Photos; SPAS = Self-perceived Attractiveness Sclae; SPMSS = Self-perceived Mating Success Scale; BES = Body Esteem Scale; SDS = Social Desirability Scale

[a] Actual N ranged from 48-64 due to missing data

* $p < .05$, ** $p < .01$

Table 15

Miscellaneous Questionnaire Comparisons Between Restricted and Unrestricted Women Who Were Grouped Based on a Median Split of Short Term Mating Orientation Scores.

	Restricted $n = 32$ [a]	Unrestricted $n = 30$ [b]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Extraversion	5.58 (0.87)	5.74 (1.10)	-0.65	.52
Agreeableness	6.98 (0.86)	7.15 (0.70)	-0.85	.40
Conscientiousness	6.07 (0.99)	6.17 (0.71)	-0.47	.64
Neuroticism	5.13 (0.99)	5.13 (1.07)	-0.03	.98
Openness	6.33 (0.82)	6.37 (0.94)	-0.20	.85
SPAS [c]	4.27 (1.05)	4.21 (1.16)	0.25	.80
SPMSS [d]	4.19 (1.25)	4.39 (1.20)	-0.64	.52
BES [e] – Sexual Attractiveness	3.57 (0.52)	3.52 (0.52)	0.42	.68
BES [e] – Weight Concern	3.06 (0.87)	2.82 (0.95)	1.03	.31
BES [e] – Physical Condition	3.51 (0.67)	3.59 (0.78)	-0.44	.67
SDS [f]	16.03 (4.40)	13.69 (4.44)	2.07	.04
Religious Beliefs on Sexual Behaviours [g]	3.90 (2.32)	2.38 (1.61)	2.97	<.01
Religious Beliefs on Sexual Attitudes [g]	3.81 (2.36)	2.34 (1.63)	2.81	<.01

Note. SPAS = Self-Perceived Attractiveness Scale; SPMSS = Self-Perceived Mating Success Scale; BES = Body Esteem Scale; SDS = Social Desirability Scale.

[a] Actual *N*s ranged from 31-32 due to missing data. [b] Actual *N*s ranged from 28-30 due to missing data. [c] Self-perceived attractiveness scale score where higher numbers indicate higher self-perceptions of attractiveness. [d] Self-perceived mating success score where higher numbers indicate higher self-perceptions of one's mate quality. [e] Body esteem scale where higher numbers indicate higher levels of satisfaction. [f] Social desirability scale score where higher numbers indicate more of a tendency to portray oneself in a positive light. [g] Religious Beliefs were assessed by having participants rate on a scale from 1 (*not at all*) to 9 (*extremely*) the degree to which their religious beliefs affect their sexual behaviour and their sexual attitudes.

Peterson, Geher, & Kaufman, 2011; Schaller & Murray, 2008; Schmitt & Shackelford, 2008). In this study, however, restricted and unrestricted women did not differ significantly on any of the five factors.

Variables related to self-perceived attractiveness and mate quality were also examined using t-tests. The group comparisons of restricted and unrestricted women indicated no relationships with self-rated measures of attractiveness or mate quality. They reported similar body-esteem scores, self-ratings of attractiveness, and self-perceived mating success. Previous research in this area has been mixed, with some research suggesting that self-rated attractive women have higher numbers of sex partners and more unrestricted sociosexuality (e.g., Penke & Asendorpf, 2008; Perilloux, Cloud, & Buss, 2013) while other studies have found no such associations (e.g., Clark, 2004; Mikach & Bailey, 1999; Stillman & Maner, 2009). The results from this study appear to suggest that STMO is not related to various measures of self-rated attractiveness and mate quality. Restricted and unrestricted women's scores were significantly different on Crowne and Marlowe's (1960) social desirability scale, $t(59) = 2.07$, $p = .042$, with restricted women tending to present themselves in a more socially desirable manner. However, social desirability was not related to number of previous sexual partners, $r(62) = -.14$, $p = .27$, suggesting that although restricted women may portray themselves in a more positive light, their actual sexual behaviours or mating strategies may not change as a function of their portrayal. Number of sex partners has previously been associated with a related construct (self-deception; Lynn, Pipitone, & Keenan, 2014), which is contrary to the findings of this study. Restricted and unrestricted women also differed on the items querying the impact one's religious views have on sexual attitudes and behaviours.

Restricted women in this sample reported that their religious beliefs impacted both their sexual attitudes, $t(58) = 2.81$, $p < .01$, and their current and past sexual behaviours, $t(58) = 2.94$, $p < .01$, more than did unrestricted women. This supports previous research indicating that sexual permissiveness is negatively associated with religious beliefs (e.g., Kardum, Gracinin, Hudek-Knesvic, 2008).

Summary and Conclusion

This study provided reliability and validity data on the recently published independent measure of short-term mating orientation (Jackson & Kirkpatrick, 2007) and the newly developed PARMSS. Test-retest reliabilities were overall quite strong. Further, the STMO and the PARMSS were related to many variables/measures known to vary as a function of mating strategies.

The STMO was positively correlated with the PSB and number of previous sexual opposite sex partners/sexual behaviours. The STMO was positively correlated with the SOI whereas the LTMO was not, suggesting that the STMO is indeed measuring short-term mating orientation independently from long-term mating orientation. The STMO was not correlated with important variables indicating relationship quality nor was it related to any personality variables or self-rated attractiveness measures.

Using the STMO as a grouping variable appears to differentiate restricted from unrestricted women. Unrestricted women (using the STMO as a grouping variable) were significantly higher on their SOI scores but were not different in their LTMO scores, suggesting that regardless of their STMO scores, women overall had similar mating strategies in terms of long-term mating orientations. Unrestricted women reported engaging in more sexual behaviours with more opposite-sex partners than did restricted

women and reported more instances of cheating on romantic partners. Restricted women were more likely to report a strong a desire to avoid pregnancy, a stronger religious affiliation, and they reported less romantic orientation towards women than did unrestricted women (although restricted and unrestricted women did not differ in their stated sexual orientation). The STMO did not appear to be measuring sex drive as restricted and unrestricted women reported similar rates of masturbation and were not different in the ease of achieving orgasm.

Together, these analyses increase the confidence in using the STMO as a grouping variable to differentiate between restricted and unrestricted women as the two groups differed on many variables that reflect key definitional aspects of sociosexual orientation. However, questions remain as to whether or not restricted and unrestricted women differ on other variables. For example, unrestricted women in this sample did not report having distinct partner preferences (contrary to Hypothesis 1) or having sex sooner in their current relationship. Further, STMO was not related to any of the big five factors of personality, despite this being a fairly robust finding in past studies (e.g., Berg et al., 2013; Eysenck, 1976; Holtzman & Strube, 2013; Peterson, Geher, & Kaufman, 2011; Schaller & Murray, 2008; Schmitt & Shackelford, 2008). STMO was also not related to any of the measures of self-perceived mate quality/attractiveness nor to measures of relationship wellbeing, although research in this area has been mixed (see Buss & Shackelford, 2008, Clark, 2004; Honekopp et al., 2007; Lukaszewski, Larson, Gildersleeve, Roney, & Haselton, 2014; Mikach & Bailey, 1999; Penke & Asendorpf, 2008; Perilloux, Cloud, & Buss, 2013; Stillman & Maner, 2009).

The PARMSS showed good test-retest reliability and internal consistency. As predicted in Hypothesis 2, both the proceptive and receptive scores were correlated with the STMO but not the LTMO, suggesting that the PARMSS is measuring mating behaviours in new/potential relationships. The proceptive and receptive scores were correlated, as were the scores between the PARMSS-I and the PARMSS-P. The PARMSS was positively related to the PSB and the proceptive scale was positively related to an increased sexual orientation towards women. The PARMSS was not related to the ATI but the receptive scale was positively related to a history of infidelity.

One major strength of this study is that the sample was fairly homogenous on several variables (e.g., age, educational level, lack of exogenous hormone use). Although generalizations may be more difficult by using such a sample, the confidence in the results may be stronger given that there is less "noise" than would be obtained were a wider sample of women included in the study.

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Study 2: Women's Periovulatory Sociosexual Tactic Shift (PSTS): A Universal Receptivity Peak but Sociosexuality Mediates Proceptivity

Abstract

The ovulatory shift has been well established (e.g., Cantu et al., 2014; Gildersleeve, Haselton, & Fales, 2014). In general, women's mate preferences and behaviours shift reliably with the menstrual cycle. However, some research has suggested that women's cyclical shifts depend on their sociosexuality (Oinonen, Klemencic, & Mazmanian, 2008) and that sociosexuality may only be related to proceptive behaviours (Seal, Agostinelli, & Hannett, 1994). Study 2 used the PARMSS to examine women's proceptive and receptive mating strategies across the menstrual cycle to determine whether or not these two strategies support the ovulatory shift hypothesis and to examine how sociosexuality may influence the ovulatory shift. Study 2 (n = 28) was a prospective pseudo-randomized counterbalanced controlled crossover design where women rated their likelihood of engaging in proceptive and receptive mating behaviours with 19 attractive men (seen in photos) at the periovulatory and luteal phases of their menstrual cycles. It was predicted that women overall would show an increase in receptive mating behaviours near ovulation (Hypothesis 1), but that sociosexuality would interact with menstrual cycle phase to predict proceptive behaviours (i.e., restricted women will become more proceptive at ovulation but unrestricted women will become less proceptive) (Hypothesis 2). It was further predicted that self-rated attractiveness would be a mechanism promoting the PSTS (Hypothesis 3). Hypotheses 1 and 2 were supported in the *Socially Visible Men Photo Condition* and the effects were most pronounced in a subsample of exclusively heterosexual women. Study 2 provides further evidence that women's sociosexuality is associated with differential shifts in proceptive mating behaviour across the menstrual cycle.

Women's Periovulatory Sociosexual Tactic Shift (PSTS): A Universal Receptivity Peak but Sociosexuality Mediates Proceptivity

Although animal research has supported that sexuality is driven by distinct processes (e.g., Hobbs, Finger, & Ferkin, 2012; Martinez & Petrulis, 2013; Moncho-Bogani, Lanuza, Lorente, & Martinez-Garcia, 2004; Sabau & Ferkin, 2013; Ventura-Aquino & Fernandez-Guasti, 2013a; Ventura-Aquino & Fernandez-Guasti, 2013b), research on these distinct processes in humans has been less well established. Study 2 aimed to delineate these processes in women and to examine how sociosexuality fits with the ovulatory shift in terms of proceptive and receptive mating strategies.

Hormones and Mating

Hormones are known to play a major role in mating behaviours (e.g., Gildersleeve, Haselton, & Fales, 2014; Pillsworth, Haselton, & Buss, 2004; Puts, 2005). This is not surprising since hormones are a driving force of sexual differentiation in the womb and play a critical role in further distinguishing the sexes at puberty. Whereas post-pubertal men show fairly steady and slow-changing sexual hormone levels across the lifetime (when controlling for diurnal variation; Granger, Shirtcliff, Booth, Kivlighan, & Schwartz, 2004), women's gonadal steroid hormones fluctuate tremendously as a function of their menstrual cycle, a cycle intimately related to reproduction. These fluctuating hormones have been shown to be related to women's sexual attitudes and behaviours (e.g., Gildersleeve, Haselton, & Fales, 2014; Roney & Simmons, 2013; Thornhill & Gangestad, 2008) and are likely an underlying factor in female sociosexuality in particular.

Overview of the menstrual cycle. Reproductive age for human females typically starts around menarche, which occurs at about 12.7 years old although it commonly ranges from 9 to 17 years (Fernandez-Rhodes et al., 2013). One study by Ferrell and colleagues (2006) examined 120 women over a combined 13,000 menstrual cycles and found that the average menstrual cycle length is 26.92 days (SD = 2.98) but a "typical" or "normal" cycle can range from 26 to 34 days (Wood, Larsen, & Williams, 1979).

The menstrual cycle operates on a feedback loop between hormones released by the hypothalamus, the pituitary gland, and the ovaries (Asso, 1983; Rathus, Nevid, Fichner-Rathus, Herold, & McKay, 2013; Schnatz, 1985). A cascade of events follows when the hypothalamus first releases gonadotropin releasing hormone (GnRH). GnRH acts on the pituitary to cause it to release both follicle stimulating hormone (FSH) and luteinizing hormone (LH). FSH then stimulates follicles in the ovary to initiate the maturation of 10 to 20 follicles. These maturing follicles within the ovaries begin to produce estrogen. When estrogen has reached a critical level, it will act on the hypothalamus to suppress the secretion of GnRH, which in turn has the effect of lowering the levels of FSH and LH. The burst follicle within the ovary that released the egg begins to emit progesterone, which prepares the uterus for implantation and also suppresses the hypothalamus from releasing GnRH (which if released, would cause the uterine lining to be shed before the egg would have a chance to implant after fertilization). Unless there is implantation, the corpus luteum begins to shrink about 14 days later and there is a sharp drop in both progesterone and estrogen at this time. Without the suppressing effects of estrogen and progesterone, the hypothalamus again begins to release GnRH, which triggers the shedding of the uterine lining and egg (i.e., menstruation) and initiates a new

menstrual cycle. If implantation does occur, the corpus luteum continues to produce high levels of progesterone until the placenta is itself able to emit sufficient progesterone to suppress GnRH.

The menstrual cycle is generally divided into two main phases: the follicular phase (day 1 to about day 12 - 15) and the luteal phase (about day 13 - 16 to the last day before the next menstruation phase begins, about day 28; Bakos, Lundkvist, Wilde, & Bergh, 1994). These phases are further divided into early, middle, and late follicular/luteal phases. The early follicular stage represents day 1 to about day 5 of the menstrual cycle (World Health Organization, 1981). In this phase, the hypothalamus is beginning to release GnRH, which causes the shedding of the uterine lining from the previous menstrual cycle. As such, the early follicular phase is typically referred to as menstruation. During this phase, GnRH is also acting on the pituitary gland to begin releasing FSH (Stricker et al., 2006), which is critical to the development of a group of follicles. Estrogen and progesterone are at their lowest level during the early follicular phase (Stricker et al., 2006).

The next phase of the menstrual cycle is the middle follicular phase and represents about day 6 to about day 11. When the FSH arrives at the ovaries, it stimulates the growth of a group of follicles. As the follicles develop, they become an important source of estrogen. When sufficient levels of estrogen are produced by the follicles, the negative feedback loop causes the release of FSH by the pituitary to decrease.

The late follicular phase is also known as the periovulatory phase. This stage is typically seen between about days 12 and 15. At this stage, there is usually only one follicle that is viable; this follicle is generally larger than the others and produces the

most estrogen. This increased level of estrogen increases uptake and binding of FSH by the follicle, which protects the follicle from the lowering levels of FSH from the pituitary. By about day 12 or 13 of the cycle, the follicles have played a major role in the estrogen peak of the cycle (Schnatz, 1985; Wilcox, Dunson, & Baird, 2000). This peak in estrogen induces a surge in LH released by the pituitary.

The biggest follicles are best able to bind with FSH, so these follicles can continue to function despite the pituitary gland's decreasing release of FSH. Follicles that are not large enough to uptake sufficient amounts of FSH to continue growing begin to undergo atresia. During this process follicles lose original tissue but begin to grow stromal tissue; this leads them to secrete androgens instead of estrogen. In the days preceding the midcycle gonadotropin surge, the ovaries excrete a small but significant amount of androgens. Indeed, levels of testosterone are higher (by about 15%) at the ovulatory phase than any other phase (Judd & Yen, 1973).

Ovulation typically occurs about 10 to 12 hours after the LH peak (Asso, 1983; Gurgen, Sihmanoglu, & Varol, 1995; Wilcox et al., 2004), usually on day 13 or 14 of the cycle. The LH surge causes the largest follicle (measuring about 2 cm in diameter) to burst, releasing a mature and fertilizable egg, which can be fertilized for up to about 20 hours after being released (Wilcox, Dunson, & Baird, 2000). Physiological changes of the vaginal canal during the LH surge increase the likelihood of sperm passing through the vaginal canal at this time. Implantation of a fertilized egg usually occurs by day 19 of the menstrual cycle.

The second major phase of the menstrual cycle is the luteal phase and lasts from about day 16 to about day 28 (Asso, 1983; Wilcox, Dunson, Weinberg, Trussell, & Baird,

2001). Whereas the length of the follicular phase is somewhat variable between women, the luteal phase is much more similar across women, lasting between 10 and 16 days in 95% of women[4] (Treloar, Boynton, Behn, & Brown, 1967). During the luteal phase, the follicle that released the ovum is transformed into the corpus luteum by LH. If no fertilization has taken place, there is a seven day regression period of the follicle. There is a slowing of GnRH through the early and middle luteal phase, but GnRH slowly begins to increase in the late luteal phase, in preparation for a new cycle. Progesterone begins to rise early in the luteal phase and reaches its peak during the middle luteal phase. If there has been a fertilization, the regression of the corpus luteum is prevented by a secretion of human chorionic gonadotrophin (hCG) from the placenta. The hCG maintains the corpus luteum, which in turn maintains the production of ovarian progesterone until the placenta is able to release enough progesterone to sustain itself independently. Over-the-counter pregnancy tests will test for the presence of hCG, with a positive result indicating pregnancy.

The premenstrual phase (or late luteal phase) is the last stage of the luteal phase. In the absence of a pregnancy, there is a sharp decrease in both estrogen and progesterone from about day 24 to day 28 (Asso, 1983; Wilcox et al., 2001). This leads to changes in the endometrium, which result in it being shed during the menstrual flow. The negative feedback loop between estrogen/progesterone and GnRH means that as estrogen and progesterone decline, GnRH (and subsequently FSH) increases. As FSH again begins to rise, the development of a new set of follicles begins, initiating a new menstrual cycle.

[4] This is why the most valid way to estimate a woman's cycle is to "count backwards" from the day she started her period. Since the luteal phase is so predictable and consistent between women, most women will have ovulated 10 to 16 days before their period started, no matter the length of their individual follicular phase.

These hormones are continuously fluctuating and so the chances of intercourse leading to pregnancy (often referred to as *conception likelihood*) is not simply a present/absent rating. Rather, conception becomes possible (although remains extremely unlikely) in the early follicular phase (i.e., during menstruation) and rapidly becomes more likely until it peaks in the late follicular phase (i.e., the periovulatory phase). In their study of 221 women, Wilcox and colleagues (2001) found that conception likelihood estimates produced a bell-shaped curve that peaked on days 12 and 13 (coinciding with the peak in estrogen) with days 11, 14, and 15 all showing slightly lower but still high conception likelihood. By about day 19, there is a drastic shift in hormones (e.g., progesterone peaks in the mid-luteal phase) that makes pregnancy virtually impossible for the remainder of the cycle (Asso, 1983; Wilcox et al., 2001). Conception likelihood is ultimately connected to the relationship between the release of the egg and timing of sexual intercourse. Physiological changes in the vaginal canal (e.g., a thickening of mucus) prior to ovulation allow sperm to live up to several days in the woman's reproductive tract but the egg only remains viable for several hours following its release (Wilcox, Dunson, & Baird, 2000). As such, conception is possible during only a few days of this 28-day cycle.

Women's sexuality across the menstrual cycle. Much research has documented the relationship between women's sexuality and hormonal status. One indication that hormones affect women's sexualities is the abundance of research suggesting that women experience increased sexual desire and engage in more sexual behaviours when they are nearing ovulation (e.g., Adams, Gold, & Burt, 1978; Bancroft, Sanders, Davidson, & Warner, 1983; Brown, Calibuso, & Roedl, 2011; Bullivant et al., 2004; Caruso et al.,

2014; Dennerstein et al., 1994; Diamond & Wallen, 2011; Gangestad, Thornhill, & Garver-Apgar, 2010a; Harvey, 1987; Matteo & Rissman, 1984; Morris, Udry, Khan-Dawood, & Dawood, 1987; Nummi & Pellikka, 2012; Pawlowski, 1999; Pillsworth, Haselton, & Buss, 2004; Roney & Simmons, 2013; Stanislaw & Rice, 1988; Van Goozen, Wiegant, Endert, Helmond, & Van de Poll, 1997; Wallen, 2001; Wilcox et al., 2004; Wlodarski & Dunbar, 2013; Zillmann, Schweitzer, & Mundorf, 1995; but see Meuwissen & Over, 1992; Regan, 1996; Tarin & Gomez-Piquer, 2002). When the natural cycle is disrupted (e.g., through chemical suppression of ovulation), some women report large decreases in sexual motivation (e.g., Schmidt et al., 2009) and menopausal women are often prescribed hormone replacement therapy (primarily some combination of estrogen and testosterone) as an effective treatment for decreased libido (e.g., Dennerstein, Burrows, Wood, & Hyman, 1980; Nathorst-Boos, Wiklund, Mattsson, Sandin, & von Schoultz, 1993), all of which supports the assumption that hormones play an important role in the sexual strategies of women.

Research into hormonal mechanisms of mating strategy shifts across the menstrual cycle has revealed several findings. First, progesterone appears to play a role in regulating women's social preferences (e.g., Maner & Miller, 2014). When progesterone is high (either in the low-fertility luteal phase or during pregnancy), women tend to prefer self-similar looking faces of both men and women (DeBruine, Jones, & Perrett, 2005), possibly as a means of maintaining parenting/caregiving mechanisms or relationships with family (i.e., individuals who are likely to support them over the long-term). Women also seem to prefer more feminine faces when progesterone is high (Jones et al., 2005;

Jones et al., 2008), possibly because such faces are perceived as “good parents”, “trustworthy”, and “warm” (Perrett et al., 1998).

Second, progesterone appears to be related to a suppression of some mating tactics. Higher levels of progesterone are associated with a decrease in sexual desire (Dennerstein et al., 1980; Garver-Apgar, Gangestad, & Thornhill, 2008; Roney & Simmons, 2013). Similarly, Garver-Apgar and colleagues (2008) found that the higher the level of progesterone, the less attractive women found the scent of symmetrical men. Perhaps related to progesterone’s effect on women’s partner preferences, Jones and colleagues (2005) found that partnered women reported the highest commitment to their partners when progesterone was high. Progesterone then, appears to be related to women’s partner preferences and sexual behaviours and generally is associated with decreased short-term mating tactics.

Third, estradiol seems to be related to women’s mid-cycle preference for high genetic quality in males. Women with high levels of estradiol have been found to prefer the scent of symmetrical men (Garver-Apgar, Gangestad, & Thornhill, 2008) and to prefer faces of men with high testosterone levels (e.g., Roney & Simmons, 2008) more so than when progesterone levels are high. Roney and Simmons (2013) found that the highest peak in sexual interest occurred approximately two days after the peak in estrogen, suggesting that the peak in women’s sexual interest coincides very closely with ovulation. In many animal species (including humans), estradiol also plays a critical role in women’s sexual functioning (e.g., Morotti et al., 2013; Thornhill & Gangestad, 2008).

Fourth, testosterone has also been linked to women’s mid-cycle shift in sexuality. Women in the periovulatory phase of the menstrual cycle (the time of the cycle when

testosterone peaks) show a stronger preference for the scent of symmetrical men than do women in the luteal phase of the menstrual cycle (the time of the cycle when testosterone is at its lowest) (Garver-Apgar, Gangestad, & Thornhill, 2008). Testosterone and estradiol are both very high during the peri-ovulatory phase, but even when controlling for estradiol, testosterone is positively associated with women's preferences for masculine faces (Welling et al., 2007). Testosterone may also be related to increased risk taking (Peper, Koolschijn, & Crone, 2013; Stanton, Liening, & Schultheiss, 2011); testosterone may be the mechanism (or one of the mechanisms) leading to women's tendency to become more open to casual sex during this periovulatory phase.

Research using implicit measures has supported the ovulatory shift hypothesis (e.g., Rudski, Bernstein, & Mitchell, 2011). Women nearing ovulation, for example, become much faster and more accurate at categorizing male faces and stereotypically male words compared to when they are in a less fertile phase (Macrae, Alnwick, Milne, & Schloerscheidt, 2002) and women near ovulation (as compared to women far from ovulation) increase their visual attention to attractive men (Anderson et al., 2010). Further, women's accuracy in judging male sexual orientation increases as they approach ovulation and this effect is magnified when women are primed to think of romantic thoughts (Rule, Rosen, Slepian, & Ambady, 2011). Moreover, women near ovulation are more avoidant of (and disgusted by) cues of incest than are women far from ovulation (e.g., Antfolk, Lieberman, Albrecht, & Santtila, 2014; Lieberman, Pillsworth, & Haselton, 2011). Together, these studies suggest that women's menstrual cycle plays an important role in variables related to mating decisions.

Research on mate-attracting behaviour also supports the ovulatory shift. Women tend to dress in more revealing or sexually appealing clothing (Beall & Tracy, 2013; Durante, Li, & Haselton, 2008; Grammer, Renninger, & Fischmann, 2004; Haselton, Mortezaie, Pillsworth, Bleske-Rechek, & Frederick, 2007), flirt more (Cantu et al., 2014), and wear more make-up (Gueguen, 2012) during more fertile phases compared to less fertile phases. Furthermore, their odour (e.g., Gildersleeve, Haselton, Larson, & Pillsworth, 2012), faces (e.g., Oberzaucher, Katina, Schmehl, Holzleitner, & Grammer, 2012) and body movements (Fink, Hugill, & Lange, 2012; Provost, Quinsey, & Troje, 2007) are rated as more attractive by men when they are in the more fertile follicular phase as compared to the luteal phase. Moreover, Haselton and Gangestad (2006) found that women were more likely to go to a club or social event (where men are likely to be present) when they were in the follicular phase as compared to the luteal phase. These studies suggest that women's menstrual cycle impacts their mate-attracting behaviours and tendencies.

Women have also been shown to make more intra-sexual comparisons (Beaulieu, 2007) and increase intra-sexual competition (Durante, Griskevicius, Cantu, & Simpson, 2014; Durante, Griskevicius, Hill, Perilloux, & Li, 2011; Fisher, 2004; Lucas & Koff, 2013; Piccoli, Foroni, & Carnaghi, 2014; Zhuang & Wang, 2014) when they are at higher conception risk as compared to lower conception risk. Lucas, Koff, and Skeath (2007) found that women near ovulation were less likely to share a monetary award with another woman than were women in a low-fertile phase of the menstrual cycle. Women's intra-sexual competition also appears to be elicited when they are exposed to the scent of other women who are near ovulation (Maner & McNulty, 2013), suggesting that women's

mating strategies are affected not only by their own hormonal status, but also by the hormonal status of other women (who may be potential rivals).

Women also shift towards short-term mating tactics when conception risk is high. Evidence for this comes from research suggesting that women's mating intelligence increases around ovulation (Peterson, Carmen, & Geher, 2013). Further, researchers have reported that women show a decrease in levels of commitment to their primary partner (e.g., Gangestad, Garver-Apgar, Cousins, & Thornhill, 2014; Jones et al., 2005), are more likely to fantasize about men other than their primary partner (Dawson, Suschinsky, & Lalumiere, 2012; Gangestad, Thornhill, & Garver, 2002), are more attracted to and flirt more with men other than their primary partner (Haselton & Gangestad, 2006), and are 2.5 times more likely to engage in extra-pair sex during the follicular as compared to the luteal phase (Baker & Bellis, 1995). Indeed, the preferences desired in a long-term partner (e.g., preferences related to kindness) do not change across the menstrual cycle (e.g., Haselton & Miller, 2006; Lucas & Koff; 2013; Moore, Law Smith, & Perrett, 2014; Oda, Okuda, Takeda, & Hiraishi, 2014; Penton-Voak & Perrett, 2000), suggesting that women's long-term partner preferences are not related to the fluctuating hormones associated with the menstrual cycle (but see Beaulieu & Havens, 2015). When rating short-term partners, however, women's preferences seem to show reliable shifts with menstrual cycle phase.

The ovulatory shift generally indicates that women appear to be most attracted to masculine features or genetic indicators of fitness when they are at their highest risk of conception (e.g., Aitken, Lyons, & Jonason, 2013; Beaulieu & Havens, 2015; Bressan & Stranieri, 2008; Cárdenas & Harris, 2007; Caryl et al., 2009; Durante et al., 2012; Flowe,

Swords, & Rockey, 2012; Gildersleeve et al., 2013; Gildersleeve, Haselton, & Fales, 2014; Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Little, Jones, & Burriss, 2007; Morrison, Clark, Gralewski, Campbell, & Penton-Voak, 2010; Navarrete, Fessler, Santos Fleischman, & Geyer, 2009; Pawlowski & Jasienska, 2005; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Peters, Rhodes, & Simmons, 2008; Peters, Simmons, & Rhodes, 2009; Provost, Troje, & Quinsey, 2008; Puts, 2005; Puts, 2006; Rantala, Polkki, & Rantala, 2010; Roney, & Simmons, 2008; Roney, Simmons, & Gray, 2011; Rupp et al., 2009; Thornhill, Chapman, & Gangestad, 2013; Vaughn, Bradley, Byrd-Craven, & Kennison, 2010; Welling et al., 2007). Women are sensitive to (and prefer) particular male traits, such as masculine faces (DeBruine et al., 2010; Frost, 1994; Johnston et al., 2001; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Roney & Simmons, 2008; Roney, Simmons, & Gray, 2011), muscular or masculine bodies/movements (Cappelle & Fink, 2013; Gangestad, Garver-Apgar, Simpson, & Cousins, 2007; Little, Jones, & Buriss, 2007; Pawlowski & Jasienka, 2005), deeper voices (Feinberg et al., 2006; Puts, 2005), socially dominant or aggressive behaviours or cues (Aitken, Lyons, & Jonason, 2013; Gangestad et al., 2007; Gangestad, Simpson, Cousins, Garver-Apgar, & Christensen, 2004; Giebel, Weierstall, Schauer, & Elbert, 2013; Lens, Driesmans, Pandelaere, & Janssens, 2012; Lukaszewski & Roney, 2009), creativity (Haselton & Miller, 2006), and low levels of fluctuating asymmetry (Gangestad & Thornhill, 1998; Rikowski & Grammer, 1999; Thornhill & Gangestad, 1999; Thornill et al., 2003; but see Oinonen & Mazmanian, 2007) more so on days when they are highly fertile than on days when they are not.

The effect of hormones on proceptive and receptive sexual behaviours. In most mammalian species, steroids produced by the ovaries have the dual effect of inducing female sexual receptivity and preparing the uterus for the possible fertilization of an egg. If there is no fertilization, the steroid production ceases, which results in a termination of sexual receptivity and the uterine lining being reabsorbed or discarded. Generally, sexual motivation, interest, and activity do not occur in the absence of the female sex steroid (e.g., estrogen). Women's receptive sexuality during the follicular phase has been well established. For example, Gueguen (2009b) found that women at a night club were more likely to respond to a courtship solicitation from an attractive male confederate when they were in the fertile phase of their menstrual cycle (defined as days 9-15 of the menstrual cycle) as compared to when women were in the menstrual or luteal phase of the menstrual cycle (defined as days 1-5 and 18-28, respectively). Similar results were found when women were approached on the street (Gueguen, 2009a).

Research on women's proceptive mating behaviours across the cycle is less clear. Early research suggested that women showed an increase in proceptive behaviours towards their spouse during ovulation whereas male initiated sexual activity remained stable across the cycle (indicating that female attractivity did not change across the cycle) (Adams, Gold, Burt; 1978). Bullivant and colleagues (2004) found similar results in that female initiated sexual activity was highest during the middle follicular phase (defined by the authors as the first day after menstruation had ceased to the day before the LH surge), with a 3 day peak ending the day of the LH surge. However, not all studies show a consistent elevation of female initiated sexual behaviours during the follicular phase (e.g., Bancroft et al., 1983; Grebe, Gangestad, Garver-Apgar, & Thornhill, 2013). In a

longitudinal study of 69 women aged 18 to 34 years old, Harvey (1987) found that although women reported increased sexual pleasure as they approached ovulation, this did not correspond to increased sexual activity with their partner; in fact, these women reported a decrease in female initiated sexual activity but an increase in masturbation frequency. Regan (1996) found that sexual desire increased in both the mid-follicular and the late-luteal phases but that no single rhythmic pattern could be said to definitively characterize the sexual experience of all women across the menstrual cycle. These findings suggest that women's receptivity may be more consistently or strongly associated with cyclical hormonal change than proceptivity.

Sociosexuality and the menstrual cycle. The ovulatory shift has received much empirical support; in general women appear to demonstrate a shift across the menstrual cycle that affects wide ranging mating-relevant variables, such as partner preferences (e.g., DeBruine et al., 2010; Frost, 1994; Johnston et al., 2001; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Roney, & Simmons, 2008; Roney, Simmons, & Gray, 2011 but see Wood, Kressel, Joshi, & Louie, 2014) and interest in sexual opportunism (Gangestad, Thornhill, & Garver-Apgar, 2010a). Although the ovulatory shift has been well established, relatively less research has examined whether women of different sociosexual orientations demonstrate similar shifts across the menstrual cycle.

Research has established that unrestricted and restricted women differ in their short-term mating orientation and also in peripheral domains that likely serve to enable the enactment of the respective strategy (e.g., memory; Smith, Jones, & Allen, 2013). Further, research has supported the hypothesis that proceptive and receptive behaviours

are driven by different processes (see Moncho-Bogani et al., 2004; Martinez & Petrulis, 2013); consequently, they may not show identical shifts across the menstrual cycle.

One reason to suggest that a subgroup of women may show a different shift across the menstrual cycle stems from research on health variables across the menstrual cycle. Research examining negative health symptoms (e.g., headaches) has found that for most women, negative symptoms tend to cluster in the luteal phase. Evolutionary theorists have proposed that this shift could lead women to experience an alleviation of symptoms in the follicular phase to facilitate mating behaviours during that phase (see Reiber, 2009). A subgroup of women, however, tend to show the opposite effect, with health complaints peaking in the follicular phase (e.g., Kiesner & Martin, 2013). Given the implications such health variables may have on mating strategies, it is possible that this shift in a minority of women is also related to sociosexual orientation.

Another reason to suspect that a subgroup of women may not follow the typical ovulatory shift hypothesis stems from research suggesting that conception risk does not always predict shifts in partner preferences or sexual behaviours in particular women. For example, women at the follicular phase who show higher levels of estradiol rate the smell of testosterone as more unpleasant than do women at the follicular phase who show lower levels of estradiol (Lubke & Pause, 2014). Moreover, Oinonen and colleagues (2008) found the opposite ovulatory shift in unrestricted women whereby the unrestricted women became more restricted and less open to engaging in a one night stand when conception risk was highest as compared to restricted women, who showed the typical ovulatory shift. The authors proposed the Periovulatory Sociosexuality Tactic Shift (PSTS), whereby women move away from their primary sociosexual orientation when

conception likelihood is highest. While the periovulatory increase in short-term mating interest for restricted women is consistent with other studies, the periovulatory decrease for unrestricted women had not been previously reported. Thus, baseline sociosexuality may influence the direction of the periovulatory shift in sexual preferences/behaviour.

The present study aimed to investigate the effect of menstrual cycle phase and sociosexuality on women's self-reported proceptive and receptive mating behaviours in new/potential relationships. The periovulatory phase has been associated with an increase in women's preference for heritable indicators of fitness, which are generally preferred more strongly by unrestricted women (e.g., DeBruine et al., 2010; Frost, 1994; Johnston et al., 2001; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Roney, & Simmons, 2008; Roney, Simmons, & Gray, 2011). How sociosexuality affects this shift for proceptive versus receptive mating behaviours, however, remains unclear.

Study 2 aimed to investigate how women's proceptive and receptive mating behaviours change across the menstrual cycle as a function of sociosexuality and to determine if self-rated attractiveness may be one mechanism promoting this shift. *Hypothesis 1*: A Periovulatory Peak in Receptive Behaviour: It was predicted that receptivity would be affected by changes in menstrual cycle phase. That is, women (i.e., both restricted and unrestricted women) were predicted to show an increase in receptive mating behaviours during the periovulatory phase. *Hypothesis 2*: A Sociosexuality Effect for Periovulatory Shifts in Proceptive Behaviour: In terms of proceptive mating behaviours, it was predicted that both restricted and unrestricted women would demonstrate the PSTS and report moving away from their primary sociosexual orientation during the periovulatory phase. That is, it was predicted that restricted women

would report being *less* restricted during the periovulatory phase (and so report more proceptive behaviours) and that unrestricted women would report being *more* restrictive (and so report fewer proceptive mating behaviours). *Hypothesis 3*: Self-rated Attractiveness as a Mechanism Promoting the PSTS: it was predicted that self-rated attractiveness would show the same interaction as in Hypothesis 2 whereby restricted women would report higher self-rated attractiveness scores in the ovulatory phase as compared to the luteal phase but that unrestricted women would show the opposite pattern.

Method

Participants

Twenty-eight women from Study 1 provided data for study 2 analyses. See study 1 for sample characteristics.

Measures

Proceptive and Receptive Mating Strategies Scale-Imaginary (PARMSS-I) and the Proceptive and Receptive Mating Strategies Scale-Photo (PARMSS-P). To measure proceptive and receptive sexual behaviours in new/potential relationships, participants were administered the Proceptive and Receptive Mating Strategy Scale - Imaginary (PARMSS-I) and Proceptive and Receptive Mating Strategy Scale – photo (PARMSS-P) (see Study 1 for a description of these measures). The proceptive and receptive behaviour items on the PARMSS-I and the PARMSS-P are identical. The vignettes differ only to reflect that the participant is either to imagine a hypothetical man (as in the PARMSS-I) or that she is to imagine that "this" man (photo; see below) is the one described in the vignette (as in the PARMSS-P). The PARMSS-P has one additional

item that queries whether or not the participant recognizes the man in the photo (all men were unfamiliar to all participants). The PARMSS-P provides two scores: an overall proceptive orientation score and an overall receptive orientation score, which are the sums of the participants' overall proceptive and receptive scores averaged across all photos.

Picture-rating task. The picture-rating task involved having participants rate the same 35 pictures of male faces used in the PARMSS-P on 18 attributes (see Appendix R), including attractiveness, health, and parenting skills. Attributes from Simpson and Gangestad's (1992) RPAI were included as rating items, and the social visibility scale attributes from the RPAI were later used to determine the most socially visible men from the group of 35 photos.

Photos of male faces. Thirty-five pictures of men were used in this study. Pictures were selected from two sources: previous research in our laboratory (i.e., Patola & Oinonen, 2008) and from open sources on the internet.

Pictures were of men with a neutral or smiling expression. The proportion of body appearing in the frame was similar to passport photos in that the face took up the majority of the frame and there were no shoulders or background visible. Pictures were presented on a computer through the program Microsoft PowerPoint. There was one picture per slide and each slide stayed on the screen while the participant completed their ratings and until the participant clicked to the next slide.

On a 9-point attractiveness scale (1 = *not at all*, 9 = *extremely*) women in this study (n = 55) rated the 35 pictures of men as fairly average (M = 4.34, SD = 1.20) but individual faces ranged in mean attractiveness ratings from 1.78 (SD = 1.20) to 7.85 (SD

= 1.34). In order to remove the possibility of floor effects in the proceptive and receptive intention ratings due to the inclusion of male photos perceived as unattractive by most women, only those photos rated highly on the social visibility scale of Simpson and Gangestad's (1992) RPAI were used in the analyses involving the photo ratings. These ratings were determined during the Picture-Rating Task (see above). To create this group of socially visible men, each photo was assessed in terms of its score on the social visibility scale of the RPAI (items from this scale were *sex appeal*, *physical attractiveness, financial status,* and *social status*), which all participants had completed for each photo during each session. Each photo's score was calculated by averaging scores from all sessions from all participants. A median split was used to select the top-rated men in terms of social visibility. This resulted in 19 men being placed in the high social visibility group. However, because of a floor effect, the mean ratings for individual faces ranged from 2.82 to 7.85 despite the group having had a mean attractiveness rating of 5.37 (n = 53).

Procedure

Study 2 utilized a prospective pseudo-randomized counterbalanced controlled crossover design. Women were tested at two different menstrual cycle phases (see below).

Randomization for menstrual cycle phase testing order. The study aimed to test participants at two different menstrual cycle phases (i.e., periovulatory and luteal) with randomized testing order to reduce the possibility of any order effects (see Suschinsky, Bossio, & Chivers, 2014). Participants were thus pseudo-randomly assigned to be counterbalanced in terms of menstrual cycle phase testing order. Regardless of

testing order, all participants experienced the exact same treatment except that their order of testing by menstrual cycle phase differed. Participants in the Periovulatory-Luteal (PL) group were first tested in the periovulatory phase while participants in the Luteal-Periovulatory (LP) group were first tested in the luteal phase. "Randomization" involved assigning participants to groups based on their next testable menstrual cycle phase at their initiation into the study. That is, if a potential participant was nearing the periovulatory phase (and available to come in for testing), she was assigned to the PL group. If the participant was nearing the luteal phase, she was assigned to the LP group. There were 33 women assigned to the PL group and 31 women assigned to the LP group.

It was possible to test participants from the PL group within the same cycle but participants in the LP group, by definition, had to be tested in two different cycles. To ensure that the average number of days between testing did not differ between the groups, 11 participants in the PL group were randomly selected to be tested in different cycles. Individuals in the PL group averaged 22.9 days between testing sessions (SD = 15.08) whereas individuals in the LP group averaged 24.86 days between testing sessions (SD = 11.14), which were not significantly different from each other, $t(45) = -.805$, $p = .43$.

Estimating menstrual cycle phase using reverse count method. Day of menstrual cycle for each woman's laboratory sessions was initially estimated using the reverse count method using information provided from her screening questionnaire. The reverse count method is a commonly used strategy for predicting menstrual cycle phase (Oinonen & Mazmanian, 2007; Pillsworth & Haselton, 2006) and is a reliable estimate of menstrual cycle phase (see Schnatz, 1985). As mentioned previously, most variability between women in menstrual cycle length is due to differing follicular phase lengths

(Treloar et al., 1967). Given the predictability of the luteal phase between women, the reverse counting method is considered a fairly accurate predictor of ovulation in most women (e.g., Pillsworth, Haselton, & Buss, 2004; Schnatz, 1985).

For the periovulatory phase, women were scheduled to be tested between -15 and -20 days from their next expected menstrual cycle (or days 9 through 14 using the forward count technique), except for 9 participants who were scheduled only after obtaining a positive LH result (see below). This phase corresponds to the phase of highest conception likelihood (Wilcox et al., 2001). Most women ovulate on day 13 or 14 (or day -15 or -16) of their menstrual cycle and women are most likely to get pregnant one day before ovulation, with probabilities decreasing each subsequent day before ovulation (Dunson, Baird, Wilcox, & Weinberg, 1999; Wilcox et al., 2001). Thus, this scheduling corresponded to the highest fertility phase of the menstrual cycle.

Women were also tested in their luteal phase, which corresponds to the lowest fertility phase of the cycle (Asso, 1983). The luteal phase was defined as including days 19 to 25 of the menstrual cycle (forward count based on a 28 day cycle), or -4 to -10 days (using the backward count technique). Participants were therefore scheduled between 4 and 10 days before their next expected menstruation.

Estimating menstrual cycle phase using Luteinizing Hormone detection measures. Although a testing session was scheduled to occur during the estimated highest fertility phase based on the reverse count method, LH data was also used to determine menstrual cycle phase for the periovulatory session. The LH detection kits were of professional grade with a sensitivity of 25mlU/ml LH and specificity greater than 98% (as per the kit instruction manual). Testing urinary LH levels has been shown to be a

reliable way of predicting when ovulation will occur - about 10 to 12 hours after the LH surge (e.g., Brown, Calibuso, & Roedl, 2011; Gurgen, Simhanoglu, & Varol, 1995).

Each woman was provided with five LH detection kits and was asked to monitor the hormone levels in her urine (see instructions in Appendix S). Participants were told the kits would measure "hormone levels" in their urine but they were unaware which hormones were being assessed or what the hormones indicated (i.e., high conception likelihood). As per kit instructions, each participant was instructed to begin LH testing on the day indicated on the chart, which varied based on the length of her average menstrual cycle (e.g., a woman who reported a regular menstrual cycle length of 28 days began LH testing on day 11, while a woman who reported a regular menstrual cycle length of 30 days began LH testing on day 13; see Appendix T for the kit instruction chart that was used to determine when each participant would begin LH testing). Participants tested their urine once a day for five days or until a positive result was obtained.

A surge in LH indicates that ovulation is imminent but the likelihood of conception is high on either side of the LH surge (Brown, Calibuso, & Roedl, 2011; Gurgen, Simhanoglu, & Varol, 1995). As such, the periovulatory phase for LH data testing was comprised of six days; laboratory sessions that occurred up to two days before the LH surge or up to 3 days after the LH surge (i.e., -2 to +3 where 0 represents the day of the positive LH result) met inclusion criteria. To ensure that at least some of the participants were tested following the LH surge, every fourth woman scheduled to be tested in the periovulatory phase (n = 9) was required to have a positive LH result before completing the laboratory session.

Determining whether or not participants were actually tested in the proper menstrual cycle phase. Fifty-five women were proposed to have been tested in the periovulatory phase. As the first step of determining if they had actually been tested within this phase, LH results were considered. Inclusion criteria required women to have a positive LH result up to 2 days before laboratory testing or up to 3 days after laboratory testing. Forty women met this inclusion criteria: 9 women had a positive result two days prior to testing, 12 women one day prior, 3 women on the day of testing, 2 women the day following testing, 10 women two days following testing, and 4 women three days following testing. Women who met this criteria were considered to have been tested in the periovulatory phase and no other criteria were considered.

Ten women failed to report a positive LH result, possibly due to kit malfunction, improper testing procedure, or failure to complete the hormonal testing (or lack of LH surge, which is unlikely in normally cycling women; Schnatz, 1985). For these women, inclusion criteria required them to have completed their laboratory session between days -20 and -15 from their next menstrual cycle using the reverse count technique (Schnatz, 1985). This strategy meant that eight additional women met inclusion criteria for the periovulatory phase.

Five women obtained a positive LH result more than three days following testing: two obtained a positive result four days after testing, two obtained a positive result five days after testing, and one woman obtained a positive result seven days after testing. These five women were considered to not have been tested during the periovulatory phase and their data was excluded from the main analyses. Thus, 48 of the 55 women that

were scheduled to be tested in the periovulatory phase were actually tested during the acceptable time frame.

To determine whether participants had been tested within the luteal phase, only the reverse count method was used (Schnatz, 1985). Fifty-five participants completed laboratory sessions that had been estimated to be in the luteal phase (although due to drop out, these were not all the same women who completed testing at ovulation). Participants were considered to have been tested in the luteal phase if they completed laboratory testing between days -10 and -4 from their next menstrual cycle. Thirty-six of these 55 women met inclusion criteria: Six women were tested on day -4, five on day -5, eight on day -6, three on day -7, six on day -8, four on day -9, and four on day -10.

The final inclusion criteria required that participants have completed laboratory testing at the appropriate time for both the periovulatory phase and the luteal phase. Although there were 48 women who met inclusion criteria for the periovulatory phase and 36 women who met inclusion criteria for the luteal phase, only 28 women met criteria for both. Hypotheses were thus tested with these 28 women who made up the final sample.

Analyses were performed to determine if the women who made up the final sample (n = 28) were in any way different from women who were not tested in the appropriate phases (n = 18; all but two of these women were tested in at least one appropriately-timed phase). Women who only completed one session (n = 18) were excluded from this analysis. Independent samples t-tests and chi-square tests were computed to compare these groups on several variables to ensure that the sample remained representative of the general population (see Table 16). Well-timed participants

Table 16

Comparisons Between Women Who Were Tested at Two Appropriately Timed Menstrual Cycle Phases (Well-Timed Participants) and Women Who Were Not Tested During the Appropriate Menstrual Cycle Phases (Poorly-Timed Participants).

	Well-Timed Participants n= 28 [a]	Poorly-Timed Participants n = 18 [b]		
	M (*SD*)	*M* (*SD*)	*t*	*p*
Age (years)	24.10 (7.50)	18.92 (0.84)	3.62	<.01
Sexual Orientation [c]	1.54 (0.99)	1.35 (1.00)	0.60	.55
Age (in years) of Menarche	12.57 (1.60)	12.61 (1.38)	-0.09	.93
Menstrual Cycle Predictability [d]	3.79 (0.88)	3.67 (0.78)	0.48	.63
Average Length of Menstrual Cycle (in days)	28.36 (2.54)	28.72 (3.51)	-0.38	.71
Religiosity [e]	7.29 (1.98)	6.59 (2.06)	1.12	.27
Desire to Avoid Pregnancy at the Current Time [f]	6.52 (1.40)	7.00 (0.00)	-1.80	.09
Days between Testing Sessions	25.25 (14.69)	20.83 (10.84)	1.19	.24
STMO [g]	2.94 (1.64)	2.80 (1.48)	0.30	.77
LTMO [h]	6.25 (0.80)	6.10 (1.02)	0.53	.60
PSB [i]	1.50 (0.51)	1.22 (0.43)	1.97	.06
SOI [j]	46.58 (22.65)	34.50 (17.88)	1.93	.06
ATI [k]	2.30 (0.76)	1.99 (0.59)	1.53	.13
Masturbation Frequency [l]	3.45 (2.04)	2.47 (1.72)	1.59	.12

		Well-Timed Participants n= 28 [l]	Poorly-Timed Participants n = 18		
		Frequency (%)	Frequency (%)	X^2	*p*
Previous use of OCs?	Yes	12 (44)	4 (22)	2.33	.13
	No	15 (56)	14 (78)		
Currently in relationship?	Yes	13 (46)	10 (56)	0.37	.55
	No	15 (54)	8 (44)		
Ever been pregnant?	Yes	4 (14)	0 (0)	2.82	.09
	No	24 (86)	18 (100)		

Note. STMO = Short-term Mating Orientation; LTMO = Long-Term Mating Orientation, PSB = Previous Sexual Behaviours, SOI = Sociosexuality Inventory, ATI = Attitudes Towards Infidelity. OC = Oral Contraceptive

[a] Actual *N*s ranged from 22 – 28 due to missing data. [b] Actual *N*s ranged from 15 – 18 due to missing data. [c] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*). [d] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [e] Religiosity ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*). [f] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [g] Scores range from 1 to 7, with higher numbers indicating more preference towards short-term mating strategies. [h] Scores range from 1 to 7, with higher numbers indicating more preference towards long-term mating strategies. [i] This scale is calculated by summing the z-score of three variables: Number of previous sexual partners, number of sexual partners in the last year, and number of one-night stands. [j] This scale was developed by Simpson and Gangestad (1991). [k] As measured by the Attitudes Towards Infidelity scale (Knox & Schacht, 2008). [l] Scores range from 1 (*never*) to 8 (at *least every day*) [m] Actual *N*s ranged from 27 – 28 due to missing data.

were found to be equivalent to poorly-timed participants on most demographic variables (e.g., sexual orientation, menstrual cycle predictability, days between testing sessions) and all attitudinal variables (e.g., attitudes towards infidelity). Well-timed participants were about five years older than poorly-timed participants [$t(44) = 3.62$, $p < .01$], perhaps suggesting that women can more accurately predict their menstrual cycle as they age. Although well-timed participants did not differ from poorly timed participants on self-reported menstrual cycle predictability [$t(44) = 0.49$, $p = .630$], menstrual cycles are known to become more regular as women age (e.g., Asso 1983; Hampson & Young, 2008). Well-timed participants also demonstrated trends towards being more unrestricted [$t(40) = 1.93$, $p = .061$], towards having had more sexual experiences [$t(42) = 1.97$, $p = .057$], and towards having been more likely to have been pregnant in the past ($X^2 = 2.82$, p = .09), all factors that are known to be associated with age (e.g., Yost & Zurbriggen, 2006), although none of these analyses reached significance. This trend for a group difference in sociosexuality is likely advantageous for this study as it decreases the likelihood of a floor effect in sociosexuality and may improve the reliability and validity of creating groups based on a restricted versus unrestricted sociosexuality.

As a further check on the randomization protocol, women in the final sample who completed their first laboratory session in the periovulatory phase were compared with women in the final sample who completed their first laboratory session in the luteal phase (see Table 17). There were no differences detected in any of the variables assessed, suggesting a random assignment of participants to the two testing phase order groups.

Table 17

Final Sample Comparisons Between Women in the Periovulatory-Luteal Group and Women in the Luteal-Periovulatory Group.

	Periovulatory-Luteal $n = 15$ [a] *M* (*SD*)	Luteal-Periovulatory $n = 13$ [b] *M* (*SD*)	*t*	*p*
Age (years)	25.33 (9.18)	22.68 (4.91)	0.97	.34
Sexual Orientation [c]	1.33 (0.82)	1.82 (1.17)	-1.18	.25
Age (in years) at Menarche	12.80 (1.01)	12.31 (2.10)	0.77	.45
Menstrual Cycle Predictability [d]	3.80 (0.56)	3.77 (1.17)	0.09	.93
Average Length of Menstrual Cycle (in days)	27.80 (2.68)	29.00 (2.31)	-1.27	.21
Religious Attendance [e]	7.80 (1.61)	6.69 (2.25)	1.48	.15
Desire to Avoid Pregnancy at the Current Time [f]	6.57 (1.16)	6.46 (1.66)	0.20	.85
Days between Testing Sessions	25.47 (16.48)	25.00 (12.99)	0.08	.93
STMO [g]	2.78 (1.49)	3.13 (1.83)	-0.55	.59
LTMO [h]	6.27 (0.87)	6.21 (0.75)	0.19	.85
PSB [i]	1.68 (2.89)	2.00 (4.31)	-0.21	.83
SOI [j]	42.15 (14.39)	51.82 (29.60)	-0.99	.34
ATI [k]	2.22 (0.97)	2.38 (0.41)	-0.60	.60
Masturbation Frequency [l]	2.92 (2.02)	4.22 (1.92)	-1.52	.14

		Periovulatory-Luteal $n = 15$ [m] Frequency (%)	Luteal-Periovulatory $n = 13$ Frequency (%)	X^2	*p*
Previous use of OCs?	Yes	6 (43)	6 (46)	0.03	.86
	No	8 (57)	7 (54)		
Currently in relationship?	Yes	6 (40)	7 (54)	0.54	.46
	No	9 (60)	6 (46)		
Ever been pregnant?	Yes	1 (7)	3 (23)	1.53	.22
	No	14 (93)	10 (77)		

Note. STMO = Short-term Mating Orientation; LTMO = Long-Term Mating Orientation, PSB = Previous Sexual Behaviours, SOI = Sociosexuality Inventory, ATI = Attitudes Towards Infidelity. OC = Oral Contraceptive

[a] Actual *N*s ranged from 13 – 15 due to missing data. [b] Actual *N*s ranged from 9 – 13 due to missing data.

[c] Sexual orientation ranged from 1 (*exclusively heterosexual*) to 9 (*exclusively homosexual*). [d] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [e] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*). [f] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [g] Scores range from 1 to 7, with higher numbers indicating more preference towards short-term mating strategies. [h] Scores range from 1 to 7, with higher numbers indicating more preference towards long-term mating strategies. [i]This scale of previous sexual behaviour is calculated by summing the z-score of three variables: Number of previous sexual partners, number of sexual partners in the last year, and number of one-night stands. [j] This scale was developed by Simpson and Gangestad (1991). [k] As measured by the Attitudes Towards Infidelity scale (Knox & Schacht, 2008). [l] Scores range from 1 (*never*) to 8 (*at least once a day*). [m] Actual *N*s ranged from 14 – 15 due to missing data.

Results

Hypotheses were tested in two conditions. In the *Imaginary Partner Condition*, hypotheses were tested using the overall proceptive and receptive scores from the PARMSS-I (i.e., when the participants imagine a partner). This condition could provide valuable information about women's likelihood of engaging in proceptive and receptive mating behaviours when they are allowed to imagine their own "perfect" partner. In a way, this condition examines a woman's true mating orientation by circumventing the constraints often imposed by real situations and the massive variability in potential mating partners. The PARMSS-P was used in the *Socially Visible Men Photo Condition*. In this condition, women's rated proceptive and receptive mating behaviours were assessed as they completed the PARMSS-P in reference to a sample of photos of socially visible men. Since mating decisions are so closely related to the specific characteristics of a potential partner, using dependent variables that reflect women's intentions when rating specific men may be a more ecologically valid analysis. The use of photo stimuli also provides for an element of control which allows one to observe between-subject differences in women's behaviour in response to the same situation or potential mate.

Hypothesis 1 (a Periovulatory Peak in Receptive Behaviour) was expected to be supported by a main effect of menstrual cycle on proceptive behaviours (as measured by the PARMSS) while Hypothesis 2 (a Sociosexuality Effect for Periovulatory Shifts in Proceptive Behaviour) was expected to be supported through an interaction between menstrual cycle phase and sociosexual orientation (as measured by Jackson & Kirkpatrick's, 2007, short-term mating orientation scale) whereby restricted women were expected to become more proceptive during the periovulatory phase and unrestricted

women were expected to become less proceptive during the periovulatory phase. Hypothesis 3 (Self-rated Attractiveness as a Mechanism Promoting the PSTS) was expected to be supported through an interaction between menstrual cycle phase and sociosexual orientation mirroring the interaction of Hypothesis 2.

Assessing Multivariate Assumptions

The data were further assessed to determine if the MANOVA assumptions had been met. Box's M multivariate test for homogeneity of variance-covariance matrix was assessed. According to Tabachnick and Fidell (2001), the assumption of homogeneity is met when the *p* value associated with the Box's M test is greater than .001. The assumption of homogeneity was met in all analyses in this study. Levene's test of homogeneity was not significant, further indicating the assumption of homogeneity had been met.

The assumption of linearity and normality were deemed to have been achieved based on examination of bivariate scatterplots. Kurtosis and skewness were assessed and each was found to be below Tabachnick and Fidell's (2001) recommended cut off of 3.

To explore multicollinearity, correlations were assessed between variables used in the main analyses (See Table 18). One correlation exceeded Tabachnick and Fidell's (2001) recommended cut off of .90. However, given that the correlation was between repeated measures variables, the assumption of multicollinearity was concluded to have been met.

This study used a 2 within (menstrual cycle phase: periovulatory, luteal) X 2 between (STMO: restricted, unrestricted) MANOVA design. The two dependent

Table 18

Intercorrelations Among Proceptive and Receptive Mating Strategy Scale Scores and Short-Term Mating Orientation Subscale Scores Across the Menstrual Cycle.

	1	2	3	4	5
1. Proceptive scale – Periovulatory phase	-				
2. Proceptive scale – Luteal phase	.82**	-			
3. Receptive scale – Periovulatory phase	.81**	.74**	-		
4. Receptive scale – Luteal phase	.70**	.84**	.85**	-	
5. STMO – Periovulatory phase	.33	.32	.43*	.24	-
6. STMO – Luteal phase	.34	.33	.52*	.34	.94**

Note. STMO = Short-term Mating Orientation
* $p < .05$ ** $p < .01$

variables were overall proceptive and receptive scale scores on the PARMSS-I (in the *Imaginary Condition*) and the overall proceptive and receptive scale scores on the PARMSS-P (in the *Socially Visible Men Photo Condition*). Two hypotheses were tested within the same MANOVA and follow-up univariate ANOVAs in each condition. *Hypothesis 1*: A Periovulatory Peak in Receptive Behaviour: It was predicted that receptivity would be affected by changes in menstrual cycle phase. That is, women (i.e., both restricted and unrestricted women) were predicted to show an increase in receptive mating behaviours during the periovulatory phase (i.e., a main effect of menstrual cycle phase on women's reported receptive behaviours). *Hypothesis 2*: A Sociosexuality Effect for Periovulatory Shifts in Proceptive Behaviour: In terms of proceptive mating behaviours, it was predicted that both restricted and unrestricted women would demonstrate the periovulatory sociosexual tactic shift and report moving away from their primary sociosexual orientation during the periovulatory phase. It was predicted that restricted women would report being *less* restricted during the periovulatory phase (and so report more proceptive behaviours) and that unrestricted women would report being *more* restrictive (and so report fewer proceptive mating behaviours). That is, an interaction between sociosexuality and menstrual cycle phase for proceptive mating behaviours was predicted. An ANOVA was also performed to test *Hypothesis 3*: Self-perceived Attractiveness as a Mechanism promoting the PSTS. It was predicted that self-perceived attractiveness would be related to the PSTS in that restricted women would experience an increase in self-perceived attractiveness in the periovulatory phase whereas unrestricted women would experience a decrease at that phase.

Hypotheses Testing in *Imaginary Partner Condition*

Descriptive summary data for the MANOVA testing Hypotheses 1 and 2 are presented in Table 19. Visual examination of these descriptive data indicates that unrestricted women had higher mean scores than restricted women at the periovulatory phase for both proceptive ($M = 5.23$ for unrestricted as compared to $M = 3.48$ for restricted) and receptive ($M = 6.72$ for unrestricted as compared to $M = 4.74$ for restricted) mating behaviours and this trend was the same in the luteal phase for both proceptive behaviour ($M = 4.84$ for unrestricted as compared to $M = 3.21$ for restricted) and receptive behaviour ($M = 6.19$ for unrestricted as compared to $M = 4.71$ for restricted). Further, women's reported likelihood of engaging in both proceptive and receptive mating behaviours appeared to be higher in the periovulatory than luteal phase, and this was true for both restricted and unrestricted women. Table 20 provides the results of the MANOVA.

A multivariate main effect of group was detected, $F(2, 23) = 4.50$, $p = .022$, partial $\eta^2 = .28$, power = .71, suggesting more self-reported mating behaviour in the unrestricted than restricted groups of women (see Figure 1). Univariate results indicated that unrestricted women reported higher levels of both proceptive mating behaviours, $F(1, 24) = 8.16$, $p < .01$, partial $\eta^2 = .25$, power = .78, and receptive mating behaviours, $F(1, 24) = 8.72$, $p = .01$, partial $\eta^2 = .27$, power = .81.

There was no effect of menstrual cycle phase in this condition, $F(2, 23) = 1.21$, $p = .317$, partial $\eta^2 = .10$, power = .24. Although the means appeared to increase in the periovulatory phase, this result was not significant for either proceptive, $F(1, 24) = 2.32$, $p = .142$, partial $\eta^2 = .09$, power = .31, or receptive mating behaviours, $F(1, 24) = 1.03$, $p = .15$, partial $\eta^2 = .08$, power = .30 (see Figure 2).

Table 19

Means (and Standard Deviations) of Mating Behaviours (Proceptive and Receptive Behaviours) as a Function of Menstrual Cycle Phase and Sociosexuality Group in Imaginary Condition ($N = 26$).

			Menstrual Cycle Phase			
			Periovulatory M(SD)	Luteal M(SD)	Means Across Cycle Phase M(SD)	Means Across Sexual Behaviours M(SD)
STMO	Restricted N = 14	Proceptive	3.48(1.57)	3.21(1.63)	3.35(1.60)	4.03(1.58)
		Receptive	4.74(1.36)	4.71(1.74)	4.71(1.55)	
	Unrestricted N = 12	Proceptive	5.23(1.57)	4.84(1.63)	5.07(1.60)	5.77(1.58)
		Receptive	6.72(1.36)	6.19(1.74)	6.47(1.55)	
Means Across STMO Groups		Proceptive	4.36(1.57)	4.03(1.63)	4.20(1.60)	
		Receptive	5.73(1.36)	5.45(1.74)	5.59(1.55)	
Means for All Sexual Behaviour for All Women			5.05(1.47)	4.74(1.69)		4.90(1.58)

Note. STMO = Short-Term Mating Orientation

Table 20

Multivariate Analysis of Variance of Proceptive and Receptive Behaviours Scores as a Function of Sociosexuality Group (Restricted, Unrestricted) and Menstrual Cycle Phase (Periovulatory, Luteal) in the Imaginary Condition.

Source of Variance	df_1	df_2	F	P
Sociosexuality Group	2	23	4.50	.022
Cycle Phase	2	23	1.21	.317
Cycle Phase x Sociosexuality Group	2	23	1.55	.235

Figure 1. A Multivariate Group Effect for the Imaginary Partner Condition

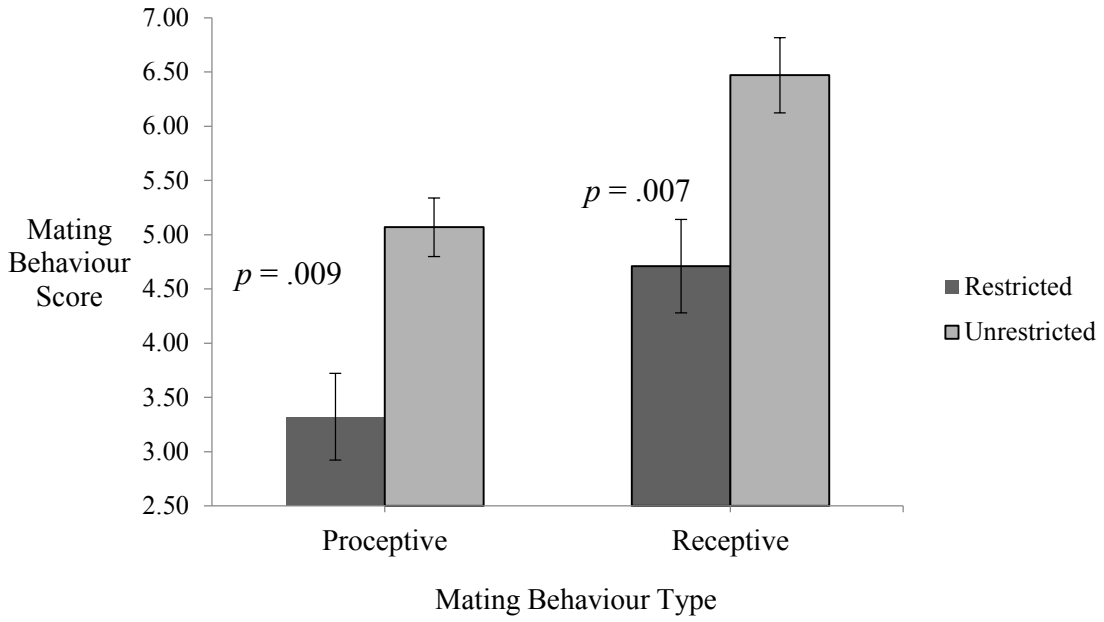

Figure 1. The figure illustrates a multivariate main effect of group, $F(2, 23) = 4.50$, $p < .05$. The two sets of bars illustrate the univariate results, which show that unrestricted women reported a higher likelihood of engaging in both proceptive, $F(1, 24) = 8.16$, $p < .01$, and receptive mating behaviours, $F(1, 24) = 8.72$, $p < .01$, than restricted women. Error bars represent the standard error of the respective mean. (Condition: Women Rating Imaginary Partners)

Figure 2. A Multivariate Effect of Menstrual Cycle Phase for the Imaginary Partner Condition

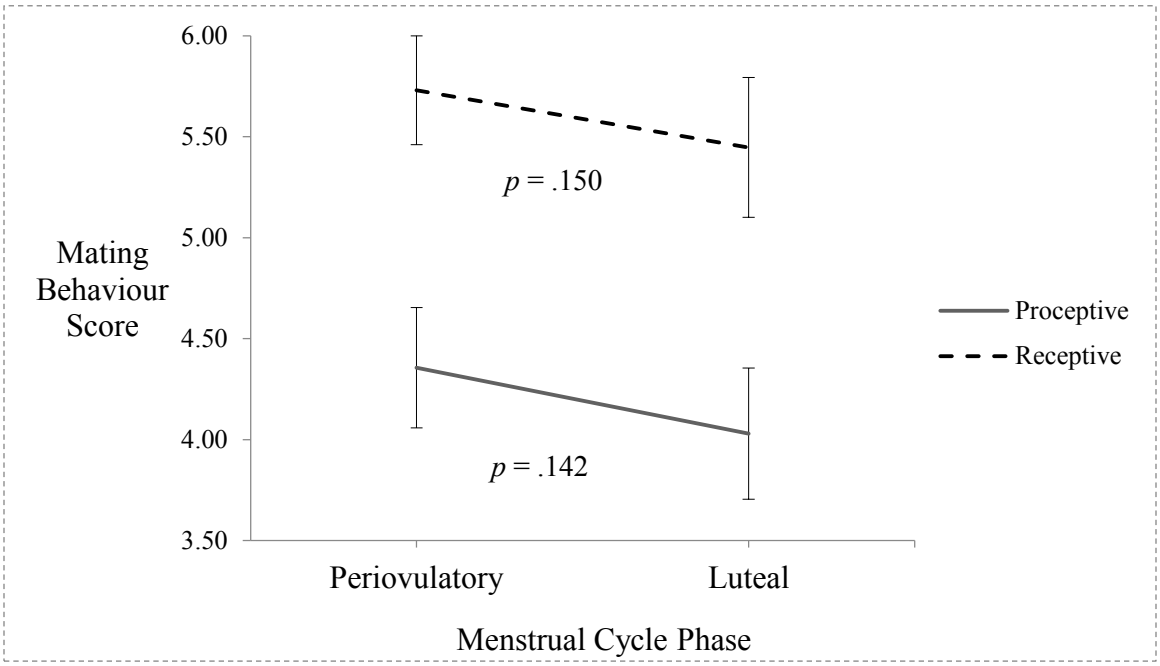

Figure 2. The figure illustrates the absence of a multivariate menstrual cycle phase effect and the fact that there is no statistical difference in overall mating behaviours between the periovulatory and the luteal phase, F (2, 23) = 1.21, p = .317. Univariate effects were not significant for either proceptive mating behaviours, F(1, 24) = 2.31, p = .142, or receptive mating behaviours, F(1, 24) = 2.21, p = .15, although the means shift in the predicted direction for both types of mating behaviours during the periovulatory phase. Error bars represent the standard error of the respective mean. (Condition: Women Rating Imaginary Partners)

There was no multivariate interaction between phase and group, $F(2, 23) = 1.55$, $p = .235$, partial $\eta^2 = .12$, power = .29. Further, univariate analyses indicated no phase by group interaction for either proceptive behaviours, $F(1, 24) = 0.01$, $p = .772$, partial $\eta^2 = .00$, power = .06, or receptive behaviours, $F(1, 24) = 1.73$, $p = .202$, partial $\eta^2 = .07$, power = .24 (see Figure 3). In this condition, unrestricted women reported more mating behaviours (both proceptive and receptive) at each menstrual cycle phase compared to restricted women and the shift across the menstrual cycle was not significantly different between the two groups. The lack of a group x phase interaction for proceptive behaviour indicated no support for hypothesis 2 in the imaginary condition.

An ANOVA was performed to test *Hypothesis 3*: Self-Rated Attractiveness as a mechanism promoting the PSTS. A 2 within (menstrual cycle phase: periovulatory and luteal) X 2 between (STMO: restricted and unrestricted) ANOVA was performed. The independent variable was self-perceived attractiveness.

Descriptive data are presented in Table 21. Visual examination of this descriptive data indicates that women reported fairly similar self-rated attractiveness scores, irrespective of menstrual cycle phase or sociosexuality group. There was no main effect of menstrual cycle phase, $F(1, 25) = 0.23$, $p = .64$, partial $\eta 2 = .01$, power = .07, or of sociosexual group, $F(1, 25) = 0.25$, $p = .62$, partial $\eta 2 = .01$, power = .08. Further, there was no interaction between menstrual cycle phase and sociosexual group, $F(1, 25) = 1.50$, $p = .23$, partial $\eta 2 = .06$, power = .22. Given the lack of ovulatory shift in self-rated attractiveness, this hypothesis was deemed to have not been supported and was subsequently omitted from further analysis.

Figure 3. A Multivariate Interaction Between Sociosexuality Group and Menstrual Cycle Phase for the Imaginary Partner Condition

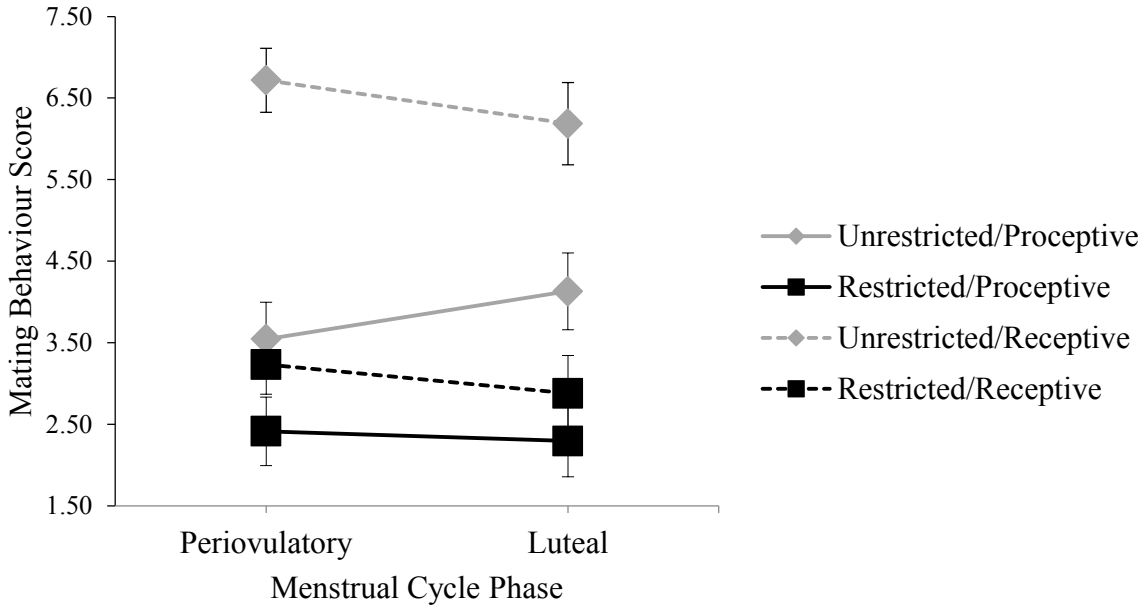

Figure 3. The figure illustrates the absence of a multivariate interaction between sociosexuality group and menstrual cycle phase, $F(2, 23) = 1.55$, $p = .235$. Restricted and unrestricted women did not differ in terms of overall mating behaviours as a function of cycle phase. Univariate ANOVA tests indicate no group x phase interaction for either proceptive mating behaviours (solid lines), $F(1, 24) = 0.86$, $p = .772$, or receptive mating behaviours (dotted lines), $F(1, 24) = 1.73$, $p = .202$. Error bars represent the standard error of the respective mean. (Condition: Women Rating Imaginary Partners)

Table 21

Means (and Standard Deviations) of Self-Rated Attractiveness as a Function of Menstrual Cycle Phase and Sociosexuality Group.

		Menstrual Cycle Phase		
		Periovulatory	Luteal	Means Across Cycle Phase
		M (SD)	M (SD)	M (SD)
STMO	Restricted (14)	4.35 (0.77)	4.45 (1.01)	4.40 (0.89)
	Unrestricted (13)	4.31 (1.33)	4.06 (1.45)	4.19 (1.39)
Means Across STMO Groups		4.33 (1.05)	4.23 (1.23)	4.29 (1.14)

Note: STMO = Short-Term Mating Orientation

Hypotheses Testing in the Socially Visible Men Photo Condition

The first two hypotheses were tested using the 19 photos of men who had been rated highest on the social visibility subscale of the RPAI scale (see above). Another 2 within (menstrual cycle phase: periovulatory and luteal) X 2 between (STMO: restricted and unrestricted) MANOVA was performed. The two dependent variables were overall mean proceptive and receptive mating behaviours scores on the PARMSS-P for the 19 photos of the most socially visible men.

Descriptive data for the MANOVA are presented in Table 22. Visual examination of this descriptive data indicates that women reported fairly low likelihoods of engaging in any mating behaviours at all. The highest cell of reported mating behaviour was 4.85 (unrestricted women, periovulatory phase, rating receptive behaviours), which corresponds to just below "neutral" on a 9-point scale measuring likelihood of mating behaviours. Despite the low mean scores overall, there were nonetheless differences in reported likelihoods of engaging in proceptive and receptive mating behaviours across groups and phases. Unrestricted women had higher means for both proceptive and receptive mating behaviours in each menstrual cycle phase. There was also a visual trend for mating behaviours to increase in the periovulatory phase, although this was not true for unrestricted women in terms of proceptive behaviours. Table 23 provides results of the MANOVA.

A main multivariate main effect for group was found, $F(2, 25) = 3.48$, $p = .047$, partial $\eta^2 = .22$, power = .60, with unrestricted women indicating higher mating behaviour scores. Univariate analyses revealed that unrestricted women had higher scores

Table 22

Means (and Standard Deviations) of Mating Behaviours as a Function of Menstrual Cycle Phase and Sociosexuality Group in the Socially Visible Men Photo Condition (N = 28).

			Menstrual Cycle Phase			
			Peri-ovulatory M(SD)	Luteal M(SD)	Means Across Cycle Phase M(SD)	Means Across Sexual Behaviours M(SD)
STMO	Restricted N = 14	Proceptive	2.74(1.20)	2.55(1.01)	2.65(1.11)	2.95(1.13)
		Receptive	3.48(1.27)	3.00(1.01)	3.24(1.14)	
	Unrestricted N = 14	Proceptive	3.76(1.69)	3.97(1.58)	3.87(1.64)	4.17(1.50)
		Receptive	4.85(1.46)	4.07(1.25)	4.46(1.36)	
Means Across STMO Groups		Proceptive	3.25(1.45)	3.26(1.30)	2.72(1.10)	
		Receptive	4.17(1.37)	3.54(1.13)	3.50(1.11)	
Means for All Sexual Behaviour for All Women			3.71(1.41)	3.40(1.22)		3.56(1.32)

Note. STMO = Short-Term Mating Orientation

Table 23

Multivariate Analysis of Variance of Proceptive and Receptive Behaviour Scores as a Function of Sociosexuality (Restricted, Unrestricted) and Menstrual Cycle Phase (Periovulatory, Luteal) in the Socially Visible Men Photo Condition.

Source of Variance	df_1	df_2	F	*p*
Sociosexuality Group	2	25	3.48	.047
Cycle Phase	2	25	18.21	<.001
Cycle Phase x Sociosexuality Group	2	25	5.06	.014

on the overall proceptive scale than did restricted women, $F(1, 26) = 5.71$, $p = .024$, partial $\eta^2 = .18$, power = .63, and this was true of the receptive scale scores as well, $F(1, 26) = 7.22$, $p = .012$, partial $\eta^2 = .22$, power = .74 (see Figure 4).

A multivariate main effect of phase was also detected, $F(2, 25) = 18.21$, $p < .01$, partial $\eta^2 = .59$, power = 1.0. The phase effect seemed to be driven by a change in receptive behaviours, $F(1, 26) = 18.81$, $p < .01$, partial $\eta^2 = .42$, power = .99; as there was no univariate effect for proceptive behaviours, $F(1, 26) = 0.00$, $p = .964$, partial $\eta^2 = .00$, power = .05 (see Figure 5). This suggests that when rating pictures of socially visible men, women's receptive scores increase when in the periovulatory versus the luteal cycle phase whereas their proceptive behaviours do not show this phase effect. This finding was consistent with hypothesis 1.

A multivariate interaction between group and menstrual cycle phase was detected, $F(2, 25) = 5.06$, $p = .014$, partial $\eta^2 = .29$, power = .77. Univariate follow-up analyses, however, did not reach significance for either proceptive behaviours, $F(1, 26) = 2.11$, $p = .158$, partial $\eta^2 = .08$, power = .29; or for receptive behaviours, $F(1, 26) = 1.08$, $p = .309$, partial $\eta^2 = .04$, power = .17. However, the interaction appeared to be driven by group differences in mating strategy shifts for proceptive mating behaviours (see Figure 6). Evidence of a group x phase interaction provided partial support for hypothesis 2, however, the group x phase effect for proceptive behaviour did not reach significance.

Given the support for the hypotheses in the *Socially Visible Men Condition*, exploratory analyses were performed with a more homogenous group of women based on sexual orientation. Although there was initially a broader exclusion criteria in order to

Figure 4. A Multivariate Group Effect for the Socially Visible Condition

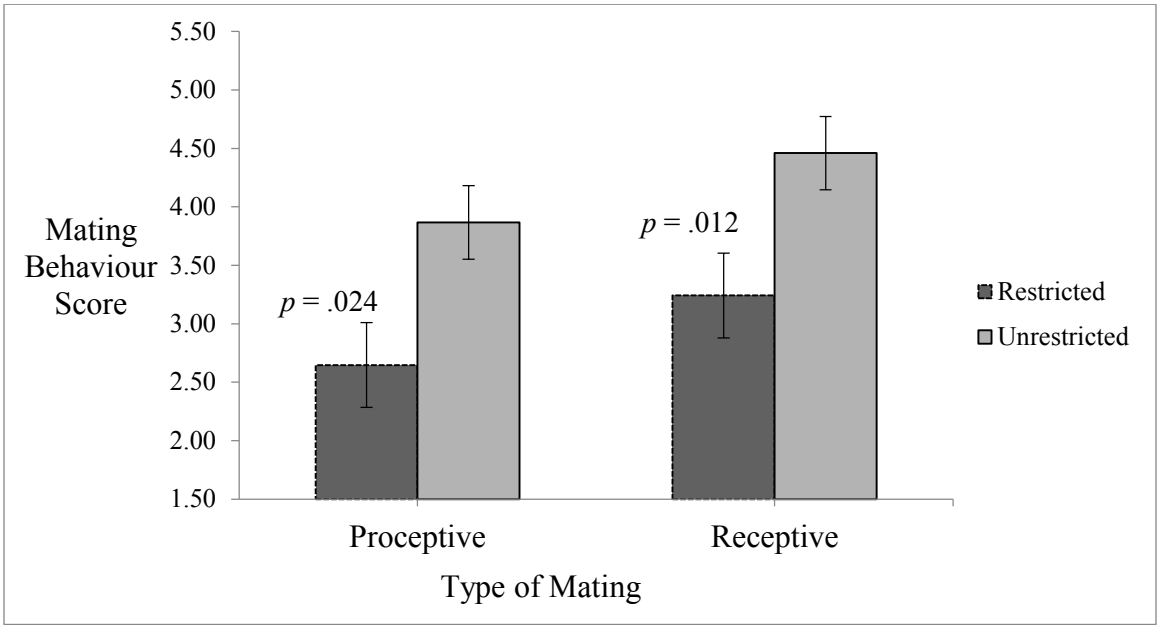

Figure 4. The figure illustrates a multivariate main effect for group, F(2, 25) = 3.48, p = .047, whereby unrestricted women reported greater mating behaviour intentions than restricted women with the photos of socially visible men. The two sets of bars illustrate the univariate results, which show that compared to restricted women, unrestricted women report higher likelihoods of engaging in both proceptive and receptive mating behaviours with these men, $F(1, 26) = 5.71$, $p = .024$ and $F(1, 26) = 7.22$, $p = .012$, respectively. Error bars represent the standard error of the respective mean. (Condition: Women Rating Socially Visible Male Photos)

Figure 5. A Multivariate Effect of Menstrual Cycle Phase for the Socially Visible Condition

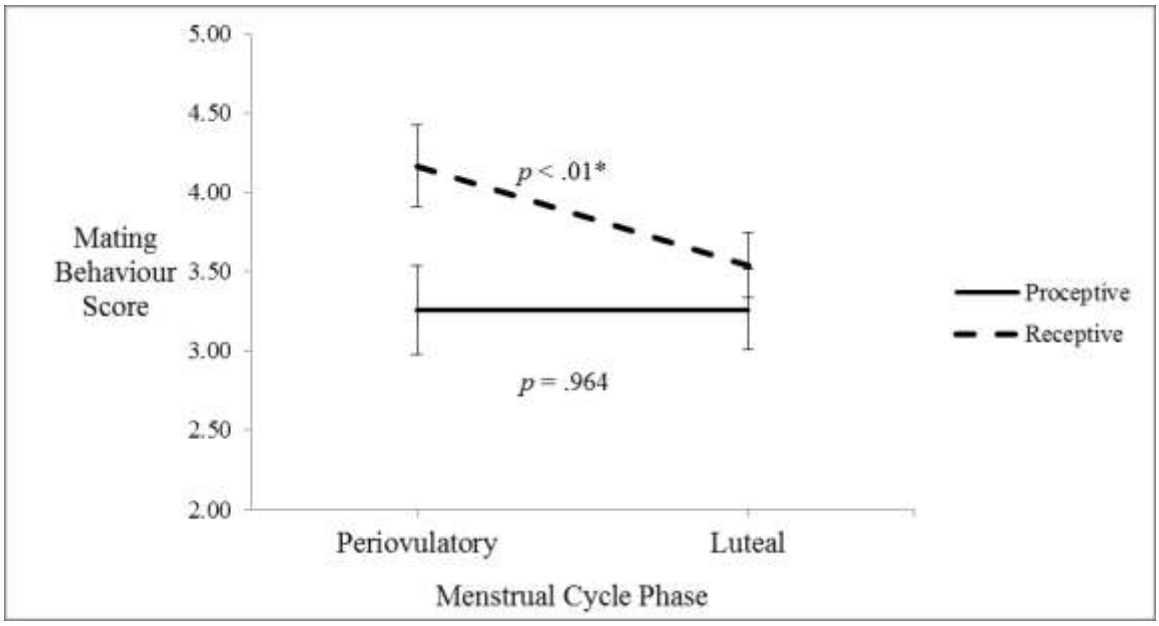

Figure 5. The figure illustrates the significant multivariate menstrual cycle phase effect, $F(2, 25) = 18.21$, $p < .01$, indicating more intended mating behaviours in the periovulatory versus luteal phase with socially visible men. Univariate analyses indicated that the phase effect is accounted for by significantly more receptive mating behaviours in the periovulatory than luteal phase, $F(1, 26) = 18.81$, $p < .01$, but no phase effect for proceptive mating behaviours, $F(1, 26) = 0.00$, $p = .964$. Error bars represent the standard errors of the respective means. (Condition: Women Rating Socially Visible Male Photos)

Figure 6. A Multivariate Interaction Between Sociosexuality Group and Menstrual Cycle Phase for the Socially Visible Condition

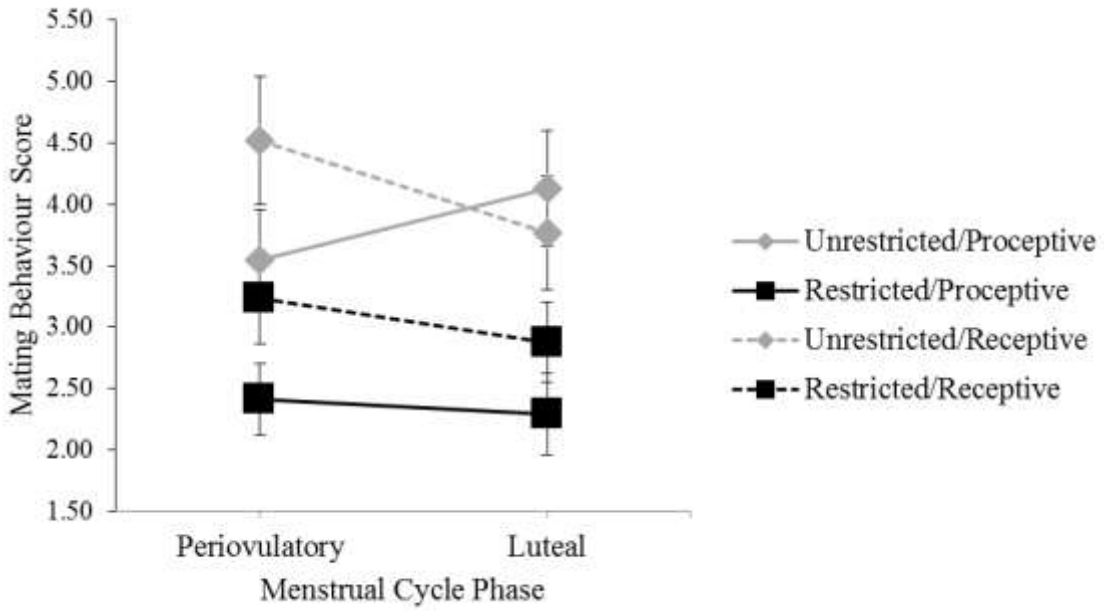

Figure 6. The figure illustrates a multivariate interaction between sociosexuality group and menstrual cycle phase for mating behaviours with socially visible men, $F(2, 25) = 5.06$, $p = .014$. However, univariate group x phase effects did not reach significance for either proceptive (solid line) or receptive (dotted line) mating behaviours, $F(1, 26) = 2.11$, $p = .158$, and $F(1, 26) = 1.08$, $p = .309$, respectively. Error bars represent the standard error of the respective mean. (Condition: Women Rating Socially Visible Male Photos)

increase the representativeness of the sample, there were four reasons to rerun the analyses with a sample of exclusively heterosexual women (i.e., women reporting a sexual orientation of *exclusively heterosexual*). First, sexual orientation is one of the most basic factors related to mating strategies and women who report no orientation towards other women are likely pursuing different mating strategies than are women who report any sexual orientation towards women. Just as women do not always show the same shifts in health variables across the cycle (e.g., Kiesner & Martin, 2013), women pursuing different mating strategies may not show similar shifts across the menstrual cycle.

Second, research examining same-sex sexual desire across the menstrual cycle in lesbian and bisexual women has demonstrated that only "strictly lesbian" women report an increase in sexual desire for a female partner during the follicular phase whereas bisexual women and women who have moved away from a previous lesbian identity report a decrease in sexual desire for a female partner when conception likelihood was high (Diamond & Wallen, 2011). This suggests that "exclusiveness" of the sexual orientation is associated with differential shifts in same-sex partner desire. This provided rationale to examine a homogenous group of strictly heterosexual women.

The third reason for re-running the analyses with a strictly heterosexual sample was because of possible hormonal differences between strictly heterosexual women and women who report any same-sex orientation. A recent meta-analysis linked an indicator of prenatal androgen exposure (2D:4D) with sexual orientation in women (Grimbos, Dawood, Burriss, Zucker, & Puts, 2010), indicating that higher androgen exposure during the prenatal stage of development is associated with an increase in same-sex orientation in women. Prenatal androgen exposure has also been linked to sociosexuality (Clark,

2004), in that higher levels of prenatal androgen exposure is associated with higher levels of unrestrictedness in women (i.e., a more male-typical sexual strategy). Although sociosexuality has not been found to be related to sexual orientation (i.e., gay men and lesbian women report levels of sociosexuality that are comparable to their heterosexual counterparts; Bailey, Kirk, Zhu, Dunne, & Martin, 2000), an unpublished manuscript (Oinonen, Teatero, & Mazmanian, 2011), indicates that prenatal androgen exposure may be differentially associated with sociosexuality depending on the sexual orientation of the female participants, as an indicator of high prenatal androgen exposure (i.e., 2D:4D) was positively associated with unrestricted sociosexuality for heterosexual women but negatively associated for lesbian and bisexual women.

The final reason to examine a more homogenous group of strictly heterosexual women was based on findings by Lubke and Pause (2014), who found that estradial levels were related to differences in mating preferences in the follicular phase; women with higher levels of estradial (at the follicular phase) rated the smell of testosterone as more unpleasant that did women with lower levels of estradial (also at the follicular phase). This may suggest that a more feminine hormonal pattern predicts different mating preferences compared to a less feminine hormonal profile.

Together, these findings suggest the possibility that hormonal exposure and hormonal mechanisms may differ in women as a function of sociosexuality. While such a conclusion may be premature, there is certainly enough rationale to further examine this hypothesis. By using a group of exclusively heterosexual women, variance related to any hormonal factors involved in sexual orientation or sociosexual orientation was reduced, thus controlling for extraneous factors.

Before testing the main hypotheses with this more homogenous exclusively heterosexual sample, group comparison analyses were performed between those women who indicated no same-sex orientation (exclusively heterosexual women) and those women who indicated some same-sex orientation (variably heterosexual women). No women who identified as "exclusively homosexual" were included in these analyses as they had been previously excluded (primarily because of the methodology in that only male stimuli were used). Independent samples t-tests and Chi-square analyses compared these two groups of women on several variables (see Table 24). More women identified as exclusively heterosexual (n = 18) than variably heterosexual (n = 8) indicating that exclusively heterosexual women were more common in the sample. These two groups of women did not differ on important variables such as age [$t(26) = -0.45$, $p = .66$] and length of average menstrual cycle [$t(26) = -1.07$, $p = .30$]. However, they were found to be significantly different on several relevant variables. For example, exclusively heterosexual women were shown to attend religious services more regularly than were variably heterosexual women [$t(26) = -2.51$, $p = .042$]. They also reported significantly lower frequencies of masturbation [$t(21) = -2.41$, $p = .027$] and were found to be more restricted on the SOI [$t(22) = -2.39$, $p = .027$]. The same trend was found on the STMO [$t(26) = -2.11$, $p = .056$], although this finding did not reach statistical significance. The group differences in sociosexuality raises the possibility of a sexual orientation confound in the above analyses and provides further rationale to examine the exclusively heterosexual women independently, despite the loss of power due to a smaller sample size.

Table 24

Comparisons Between Heterosexual Women Who Indicated No Same-Sex Orientation (Exclusively Heterosexual) and Heterosexual Women Who Indicated Some (But Not Exclusive) Same-Sex Orientation (Variably Heterosexual Women).

	Exclusively Heterosexual *N*= 18 [a]	Variably Heterosexual *N* = 8 [b]		
	M (SD)	M (SD)	*t*	*p*
Age (years)	24.67(8.78)	23.45(4.95)	-0.45	.66
Age (in years) of Menarche	12.72(1.49)	12.50(2.00)	0.28	.78
Menstrual Cycle Predictability [c]	4.00(0.59)	3.25(1.28)	1.58	.15
Average Length of Menstrual Cycle (in days)	28.00(3.05)	28.88(1.13)	-1.07	.30
Religious Attendance [d]	7.06(2.10)	8.25(0.71)	-2.51	.04
Desire to Avoid Pregnancy at the Current Time [e]	6.65(1.06)	6.25(2.12)	0.51	.63
Days between Testing Sessions	25.61(13.69)	25.63(19.21)	0.01	.99
STMO [f]	2.42(1.49)	3.88(1.69)	-2.11	.06
LTMO [g]	6.37(0.82)	6.11(0.75)	0.79	.44
PSB [h]	0.91(2.84)	3.79(4.24)	-1.75	.11
SOI [i]	36.00(14.09)	61.00(27.58)	-2.39	.04
ATI [j]	2.14(0.79)	2.67(0.67)	-1.75	.10
Masturbation Frequency [k]	2.86(2.28)	4.57(0.98)	-2.41	.03

		Exclusively Heterosexual *N*= 18	Variably Heterosexual *N* = 8 [l]		
		Frequency (%)	Frequency (%)	X^2	*p*
Previous use of OCs?	Yes	8(44)	3(43)	0.01	.94
	No	10(56)	4(57)		
Currently in relationship?	Yes	8(44)	5(63)	0.72	.40
	No	10(56)	3(38)		
Ever been pregnant?	Yes	1(6)	2(25)	2.05	.15
	No	17(94)	6(75)		

Note. STMO = Short-term Mating Orientation; LTMO = Long-Term Mating Orientation, PSB = Previous Sexual Behaviours, SOI = Sociosexuality Inventory, ATI = Attitudes Towards Infidelity. OC = Oral Contraceptive

[a] Actual Ns ranged from 17 – 18 due to missing data. [b] Actual Ns ranged from 7 – 8 due to missing data.

[c] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [d] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*). [e] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [f] Scores range from 1 to 7, with higher numbers indicating more preference towards short-term mating strategies. [g] Scores range from 1 to 7, with higher numbers indicating more preference towards long-term mating strategies. [h]This scale is calculated by summing the z-score of three variables: Number of previous sexual partners, number of sexual partners in the last year, and number of one-night stands. [i] This scale was developed by Simpson and Gangestad (1991). [j] As measured by the Attitudes Towards Infidelity scale (Knox & Schacht, 2008). [k] Scores range from 1 (*never*) to 8 (at *least every day*) [l] Actual Ns ranged from 7 –8 due to missing data.

Given the reasons outlined above, the hypotheses were tested again including only those participants who identified as "exclusively heterosexual" (i.e., a '1' on a 9-point scale of sexual orientation). This resulted in 12 women in the restricted group and six women in the unrestricted group. These 12 restricted women were compared to the six unrestricted women in this more narrowly defined group of exclusively heterosexual women (see Table 25). The groups remained equivalent in terms of most variables except that restricted women reported attending religious services more frequently than did unrestricted women, $t(18) = -2.23$, $p = .042$. Importantly, these groups of women remained significantly different in terms of their scores on the STMO, [$t(18) = -3.94$, $p = .009$].

Hypothesis Testing in the Socially Visible Men Photo Condition Using Only Exclusively Heterosexual Women

The same two hypotheses were tested using the same 19 pictures of the socially visible men. However, only those women who identified as exclusively heterosexual were included in these analyses. A 2 within (menstrual cycle phase: periovulatory and luteal) X 2 between (STMO: restricted and unrestricted) MANOVA was performed. The two dependent variables were overall proceptive and receptive mating behaviour scores on the PARMSS-P averaged across the photos.

Raw data for the MANOVA are presented in Table 26. Visual examination of these descriptive data indicates that unrestricted women had higher means than the restricted women for both proceptive and receptive mating behaviours in each menstrual cycle phase. Mating behaviours appeared to increase in the periovulatory phase, although this was not true for unrestricted women in terms of proceptive behaviours.

Table 25
Comparisons Between Restricted and Unrestricted Women Who Identified as Exclusively Heterosexual.

	Restricted N= 12 [a]	Unrestricted N = 6 [b]		
	M (SD)	M (SD)	t	p
Age (years)	23.67 (10.19)	26.67 (5.15)	-0.83	.42
Age (in years) of Menarche	12.67 (1.67)	12.83 (1.17)	-0.25	.81
Menstrual Cycle Predictability [c]	4.17 (0.58)	3.67 (0.52)	1.86	.09
Average Length of Menstrual Cycle (in days)	27.50 (3.48)	29.00 (1.79)	-1.21	.25
Religious Attendance [d]	6.50 (2.36)	8.17 (0.75)	-2.23	.04
Desire to Avoid Pregnancy at the Current Time [e]	7.00 (0.00)	6.00 (1.67)	1.46	.20
Days between Testing Sessions	28.42(13.81)	20.00 (12.67)	1.29	.22
STMO [f]	1.60 (0.48)	4.06 (1.49)	-3.94	.01
LTMO [g]	6.33 (0.89)	6.42 (0.72)	-0.23	.83
PSB [h]	0.02 (1.61)	3.04 (4.14)	-1.59	.18
SOI [i]	30.67 (12.09)	45.60 (13.16)	-2.09	.07
ATI [j]	2.13 (0.78)	2.16 (0.90)	-0.06	.95
Masturbation Frequency [k]	2.44 (2.19)	3.60 (2.51)	-0.86	.42

		Restricted N= 12	Unrestricted N = 6		
		Frequency (%)	Frequency (%)	X^2	p
Previous use of OCs?	Yes	4 (33)	4 (67)	1.80	.18
	No	8 (67)	2 (33)		
Currently in relationship?	Yes	5 (42)	3 (50)	0.11	.74
	No	7 (58)	3 (50)		
Ever been pregnant?	Yes	1 (8)	0 (0)	0.53	.47
	No	11 (92)	6 (100)		

Note. STMO = Short-term Mating Orientation; LTMO = Long-Term Mating Orientation, PSB = Previous Sexual Behaviours, SOI = Sociosexuality Inventory, ATI = Attitudes Towards Infidelity. OC = Oral Contraceptive

[a] Actual Ns ranged from 9 – 12 due to missing data. [b] Actual Ns ranged from 5 – 6 due to missing data.

[c] Menstrual cycle predictability ranged from 1 to 5 with higher numbers indicating higher predictability of one's next menstrual cycle. [d] Religious Attendance ranged from 1 (*I attend religious services daily*) to 9 *(I never attend religious services*).[e] Desire to avoid pregnancy ranged from 1 to 7 with higher numbers indicating a greater desire to avoid pregnancy. [f] Scores range from 1 to 7, with higher numbers indicating more preference towards short-term mating strategies. [g] Scores range from 1 to 7, with higher numbers indicating more preference towards long-term mating strategies. [h]This scale is calculated by summing the z-score of three variables: Number of previous sexual partners, number of sexual partners in the last year, and number of one-night stands. [i] This scale was developed by Simpson and Gangestad (1991). [j] As measured by the Attitudes Towards Infidelity scale (Knox & Schacht, 2008). [k] Scores range from 1 (*never*) to 8 (at *least every day*)

Table 26

Means (and Standard Deviations) of Mating Behaviours as a Function of Menstrual Cycle Phase and Sociosexuality Group Using Photos of Socially Visible Men and Exclusively Heterosexual Women Raters ($N = 18$).

			Menstrual Cycle Phase			
			Peri-ovulatory M(SD)	Luteal M(SD)	Means Across Cycle Phase M(SD)	Means Across Sexual Behaviours M(SD)
STMO	Restricted $N = 12$	Proceptive	2.41(1.01)	2.29(1.15)	2.35(1.08)	2.70(1.15)
		Receptive	3.23(1.28)	2.88(1.13)	3.05(1.21)	
	Unrestricted $N = 6$	Proceptive	3.54(1.01)	4.13(1.15)	3.84(1.08)	3.99(1.15)
		Receptive	4.51(1.28)	3.77(1.14)	4.14(1.21)	
Means Across STMO Groups		Proceptive	2.98(1.01)	3.21(1.15)	3.10(1.08)	
		Receptive	3.87(1.28)	3.32(1.14)	3.60(1.21)	
Means for All Sexual Behaviour for All Women			3.43(1.15)	3.27(1.15)		3.35(1.15)

Note. STMO = Short-Term Mating Orientation

Table 27

Multivariate Analysis of Variance of Proceptive and Receptive Scores as a Function of Sociosexuality Group (Restricted, Unrestricted) and Menstrual Cycle Phase (Periovulatory, Luteal) in the Socially Visible Men Photo Condition (with Exclusively Heterosexual women).

Source of Variance	df_1	df_2	F	*p*
Sociosexuality Group	2	15	4.62	.027
Cycle Phase	2	15	15.65	<.01
Cycle Phase x Sociosexuality Group	2	15	7.82	.005

A main effect for group was found (see Table 27), $F(2, 15) = 4.62$, $p = .027$, partial $\eta^2 = .38$, power = .69, indicating that unrestricted women reported a higher likelihood of engaging in mating behaviours than did restricted women. As expected, unrestricted women had higher scores on the overall proceptive scale than did restricted women, $F(1, 16) = 8.16$, $p = .011$, partial $\eta^2 = .27$, power = .62. Scores did not differ significantly on the overall receptive scale, $F(1, 16) = 3.45$, $p = .082$, partial $\eta^2 = .10$, power = .23; however, a trend did suggest that unrestricted women were more receptive than restricted women; see Figure 7).

There was a strong main effect of phase, $F(2, 15) = 15.65$, $p < .01$, partial $\eta^2 = .68$, power = 1.0, indicating greater mating behaviour in the periovulatory versus luteal phase. Univariate follow-up analyses demonstrated that this phase effect was driven by a large shift in receptive behaviours, $F(1, 16) = 13.10$, $p < .01$, partial $\eta^2 = .45$, power = .92, with women becoming much more receptive during the periovulatory phase. This effect was consistent with hypothesis 1. There was no reliable shift in proceptive behaviours across the menstrual cycle, $F(1, 16) = 2.56$, $p = .129$, partial $\eta^2 = .14$, power = .33 (see Figure 8). This suggests that for exclusively heterosexual women, mating behaviours with socially visible men increase in the periovulatory phase and this increase is largely driven by an increase in receptive mating behaviours.

Finally, the interaction between menstrual cycle phase and sociosexuality group on mating behaviours was assessed. An interaction between group membership and menstrual cycle phase was found, $F(2, 15) = 7.82$, $p = .005$, partial $\eta^2 = .51$, power = .90, suggesting that women's mating behaviours vary by phase as a function of sociosexuality. Univariate follow-up analyses revealed that this interaction was present

Figure 7. A Multivariate Group Effect for Exclusively Heterosexual Women in the Socially Visible Condition

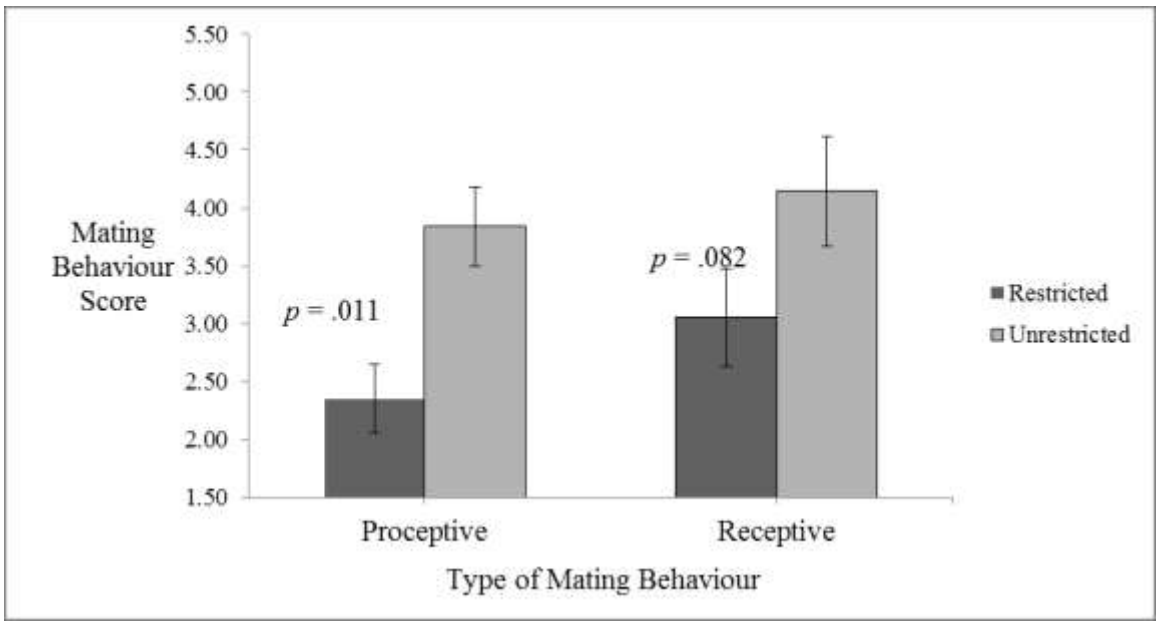

Figure 7. The figure illustrates a main effect of group for reports of intended mating behaviours when the exclusively heterosexual women rated socially visible men, $F(2, 15) = 4.62$, $p = .027$. The two sets of bars illustrate the univariate results, which show that unrestricted women report higher likelihoods of engaging in proceptive mating behaviours, $F(1, 16) = 8.16$, $p = .011$, and a similar trend nearing significance was found with receptive mating behaviours, $F(1, 16) = 3.45$, $p = .082$. Error bars represent the standard error of the respective mean. (Condition: Exclusively Heterosexual Women Rating Socially Visible Men)

Figure 8. A Multivariate Effect of Menstrual Cycle Phase for Exclusively Heterosexual Women in the Socially Visible Condition

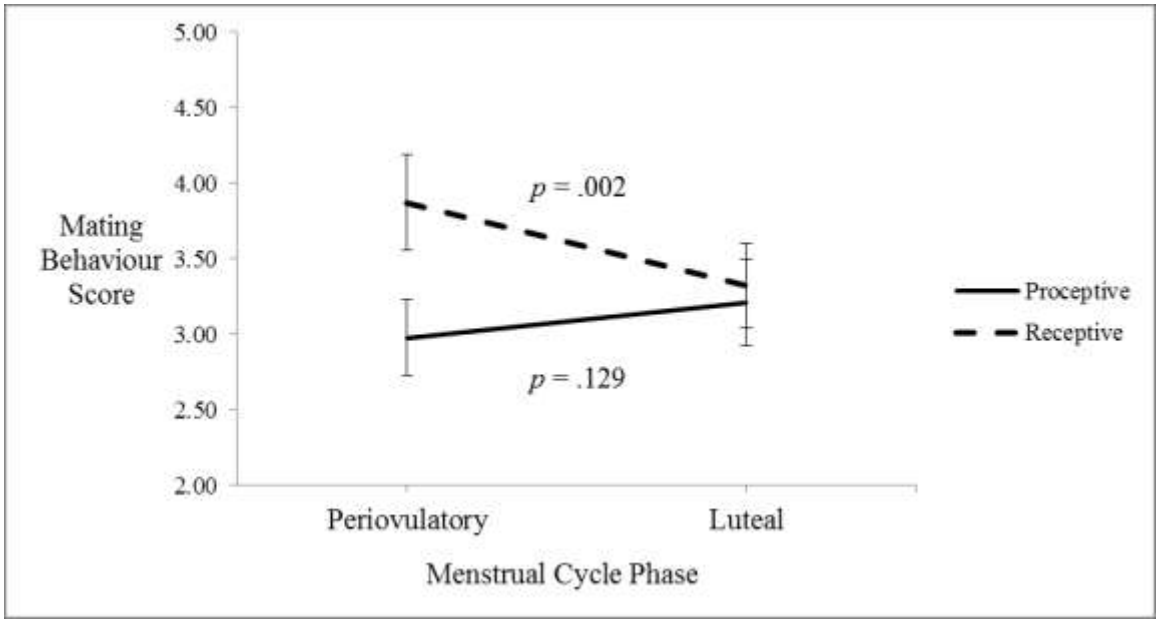

Figure 8. The figure illustrates the significant menstrual cycle phase effect whereby exclusively heterosexual women report more mating behaviours in the periovulatory versus the luteal phase when evaluating socially visible men, $F(2, 15) = 15.65$, $p < .01$. Univariate effects reveal this main effect is driven by an increase in receptive mating behaviours during the periovulatory phase, $F(1, 16) = 13.10$, $p = .002$. A weak trend suggests that women became less proceptive during the periovulatory phase, $F(1, 16) = 2.56$, $p = .129$. Error bars represent the standard error of the respective mean. (Condition: Exclusively Heterosexual Women Rating Socially Visible Men)

Figure 9. A Multivariate Interaction Between Sociosexuality Group and Menstrual Cycle Phase for Exclusively Heterosexual Women in the Socially Visible Condition

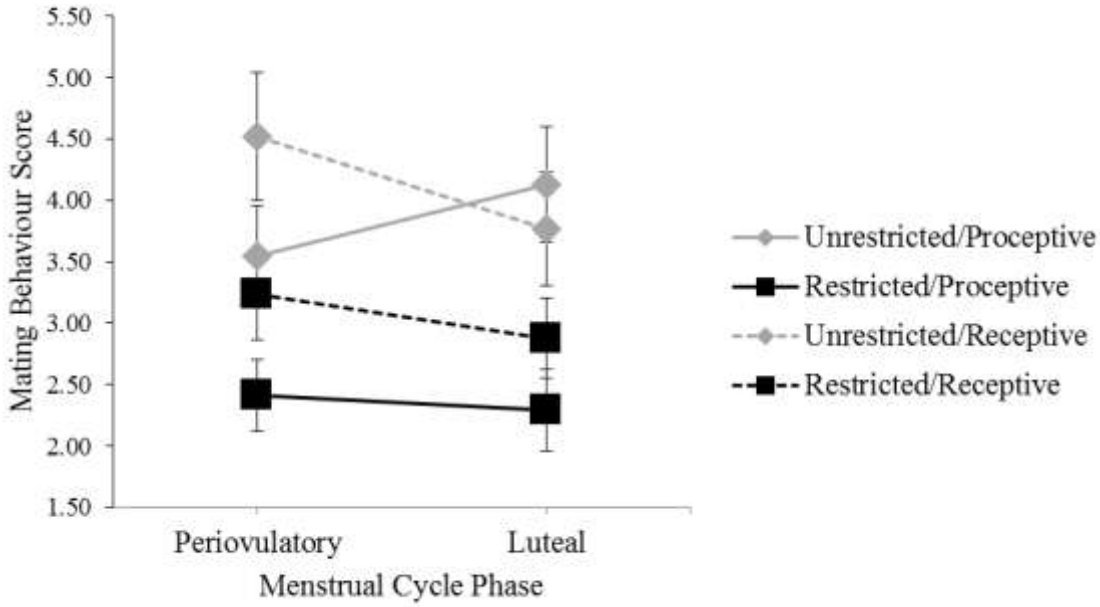

Figure 9. The figure illustrates a multivariate interaction between sociosexuality group and menstrual cycle phase for the exclusively heterosexual women's intended mating behaviours when evaluating socially visible men, $F(2, 15) = 7.82$, $p < .01$. Univariate results revealed that proceptive mating behaviours across the menstrual cycle (solid lines) were different for restricted and unrestricted women, $F(1, 16) = 5.85$, $p = .028$, with restricted women tending to be higher in the periovulatory phase and unrestricted women tending to be lower. On the other hand, the restricted and unrestricted exclusively heterosexual women showed similar patterns of receptive mating behaviour shifts across the menstrual cycle (dotted lines), $F(1, 16) = 1.69$, $p = .212$. Error bars represent standard error of the respective mean. (Condition: Exclusively Heterosexual Women Rating Socially Visible Men)

for proceptive behaviours, $F(1, 16) = 5.85$, $p = .028$, partial $\eta^2 = .27$, power = .62, but not for receptive mating behaviours across the cycle, $F(1, 16) = 1.69$, $p = .212$, partial $\eta^2 = .10$, power = .23 (see Figure 9). This group x phase effect for proceptive behaviours provided support for hypothesis 2 in that the pattern of results indicated that restricted women's proceptive behaviours were higher in the luteal phase whereas unrestricted women's proceptive behaviours were higher in the periovulatory phase.

Discussion

Summary of Results

Hypothesis one predicted that receptive mating behaviours would shift with menstrual cycle phase (*Hypothesis 1*: A Periovulatory Peak in Receptive Behaviour). That is, both restricted and unrestricted women were predicted to show an increase in receptive mating behaviours during the periovulatory phase. Hypothesis one was largely supported, although the main effect did not quite reach significance in the *Imaginary Condition*. When rating pictures of *Socially Visible Men,* however, women (regardless of their sociosexuality) showed a clear increase in receptive mating behaviours when in the periovulatory phase.

Hypothesis two predicted that both restricted and unrestricted women would demonstrate the periovulatory sociosexual tactic shift (PSTS; Oinonen, Klemencic, & Mazmanian, 2008) in terms of proceptive mating behaviours and would report moving away from their primary sociosexual orientation when conception likelihood was high *(Hypothesis 2*: A Sociosexuality Effect for Periovulatory Shifts in Proceptive Behaviour). That is, it was predicted that restricted women would report being *less* restricted during the periovulatory phase (and so report more proceptive behaviours) and that unrestricted

women would report being *more* restrictive (and so report fewer proceptive mating behaviours). Hypothesis two was not supported in the *Imaginary Condition* as there was no multivariate main interaction between sociosexuality group and menstrual cycle phase for proceptive behaviours. However, the hypothesis was supported when women evaluated photos of socially visible men (and the effect was strongest in a sample of exclusively heterosexual women). While mating behaviours differed significantly as a function of both cycle phase and sociosexuality group, the univariate interaction for proceptive mating behaviours was only significant when using a subsample of exclusively heterosexual women. That is, in exclusively heterosexual women, those who were restricted showed an increase in their proceptive behaviours from the periovulatory to luteal phase, relative to unrestricted women, who showed more of a decrease from the periovulatory to luteal phase.

Hypothesis three predicted that self-rated attractiveness could be a mechanism that promotes the PSTS. As such, it was predicted that self-rated attractiveness would show the same interaction that was predicted in Hypothesis two, that restricted women would perceive themselves as more attractive during the periovulatory phase (thus facilitating more proceptive behaviours) whereas unrestricted women would perceive themselves as less attractive during the periovulatory phase (thus facilitating fewer proceptive behaviours). Contrary to what was predicted, women's self-perceived attractiveness did not change across the menstrual cycle as a function of sociosexuality; as such, the hypothesis was deemed to not have been supported and was dropped from subsequent analyses.

Discussion of Hypotheses Testing Results

Hypothesis one was supported. The menstrual cycle shift in receptive mating behaviours (i.e., periovulatory peak) was clearly apparent in the *Socially Visible Men Photo Condition* and this finding fits with the plethora of research documenting a shift in women's sexuality across the menstrual cycle. When in the periovulatory phase, women report increased sexual desire and engage in more sexual behaviours (e.g., Adams, Gold, & Burt, 1978; Bancroft, Sanders, Davidson, & Warner, 1983; Brown, Calibuso, & Roedl, 2011; Bullivant et al., 2004; Caruso et al., 2014; Dennerstein et al., 1994; Diamond & Wallen, 2011; Gangestad, Thornhill, & Garver-Apgar, 2010a; Harvey, 1987; Matteo & Rissman, 1984; Morris, Udry, Khan-Dawood, & Dawood, 1987; Nummi & Pellikka, 2012; Pawlowski, 1999; Pillsworth, Haselton, & Buss, 2004; Roney & Simmons, 2013; Stanislaw & Rice, 1988; Van Goozen, Wiegant, Endert, Helmond, & Van de Poll, 1997; Wallen, 2001; Wilcox et al., 2004; Wlodarski & Dunbar, 2013; Zillmann, Schweitzer, & Mundorf, 1995; but see Meuwissen & Over, 1992; Regan, 1996; Tarin & Gomez-Piquer, 2002). The finding also fits with studies indicating that women are more attracted to features that signify masculinity/dominance (e.g., Aitken, Lyons, & Jonason, 2013; Cappelle & Fink, 2013; DeBruine et al., 2010; Feinberg et al., 2006; Frost, 1994; Gangestad et al., 2004; Gangestad et al., 2007; Giebel et al., 2013; Havlicek, Roberts, & Flegr, 2005; Johnston et al., 2001; Lens et al., 2012; Little, Jones, & Buriss, 2007; Lukaszewski & Roney, 2009; Pawlowski & Jasienka, 2005; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Puts, 2005; Puts, 2006; Roney, & Simmons, 2008; Roney, Simmons, & Gray, 2011) or genetic fitness (e.g., Anderson et al., 2010; Antfolk et al., 2014; Gangestad & Thornhill, 1998; Haselton & Miller, 2006; Lieberman, Pillsworth, & Haselton, 2011; Manning, Scutt, Whitehouse, Leinster, & Walton, 1996;

Puts, 2005; Rikowski & Grammer, 1999; Thornhill & Gangestad, 1999; Thornill et al., 2003) when in the periovulatory as compared to the luteal phase. Most of the above research has focussed on cyclical shifts in general or specific aspects of sexual behaviour as opposed to looking at receptive mating behaviour as a whole. However, one study that clearly focused on one type of receptive behaviour (i.e., accepting an invitation to dance) has also shown that women are more likely to accept invitations to dance by attractive males when in the periovulatory phase (Gueguen, 2009b). Thus, the present finding examining a much larger range of receptive sexual behaviours (i.e., from giving one's phone number to accepting offers of sex) provides broader evidence that women's sexual receptivity peaks during the high conception likelihood phase of the menstrual cycle (i.e., periovulatory phase).

One finding in this study is that stronger support for the hypotheses was obtained when participants viewed actual male stimuli (i.e., photos) as opposed to imagining a potential ideal mate. That is, the *Imaginary Condition* did not elicit the menstrual cycle shift that was elicited in the *Socially Visible Men Photo Condition*. This may be because actual mating behaviours are influenced by a large number of factors, many of which are fluid and change depending on characteristics of both the situation and the potential partner. Although one may hold a reasonable belief about how one would hypothetically behave, many other factors (e.g., the attractiveness of the male, the potential of a long-term relationship with the male) contribute to one's actual behaviour and these factors simply may not have been present or sufficiently salient in the *Imaginary Condition* to trigger women's actual sexual strategies. As a result, women may have underestimated their actual mating behaviours.

In the present study however, it appears that women were actually reporting a higher likelihood of engaging in all mating behaviours with an ideal mate than they were in response to actual men. Proceptive mating behaviours in the *Imaginary Condition* were higher than those in the *Socially Visibly Men Photo Condition* for both the periovulatory phase [$M = 4.24$ and $M = 3.18$, respectively; $t(26) = 5.39$, $p < .01$] and the luteal phase [$M = 4.02$ and $M = 3.23$, respectively; $t(26) = 4.39$, $p < .01$]. Similarly, receptive mating behaviours were also higher in the *Imaginary Condition* as compared to the *Socially Visible Men Photo Condition* in both the periovulatory phase [$M = 5.70$ and $M = 4.12$, respectively; $t(26) = 10.77$, $p < .01$] and the luteal phase [$M = 5.39$ and $M = 3.51$, respectively; $t(26) = 8.46$, $p < .01$]. Related to this, it is possible that this sample of women had a difficult time imagining or being able to visualize the type of partner or the situation meant to be presented. Although the situations were meant to represent varying possible levels of commitment, women might have nonetheless imagined an ideal partner that would be a good (or ideal) long-term partner (perhaps in addition to being a good short-term partner). This would not necessarily be surprising, since women are generally oriented towards long-term relationships (Simpson & Gangestad, 1991) and because women may engage in casual sexual relationships with expectations of future long-term relationships (Fisher & Cox, 2009; Weaver, MacKeigan, & MacDonald, 2011). The failure to elicit a menstrual cycle shift in the *Imaginary Condition* therefore could be due to the fact that women were imagining an ideal long-term partner rather than a short-term or one-night stand type of relationship, and it is short-term sexual relationships that appear to be most sensitive to hormonal fluctuations across the menstrual cycle (see Gangestad et al., 2007).

Another weakness of the *Imaginary Condition* is related to power. There are fewer items to evaluate within the *Imaginary Condition* as compared to the *Socially Visible Men Photo Condition*. Whereas the *Socially Visible Men Photo Condition* contained evaluations of 19 different men, the *Imaginary Condition* involved one single hypothetical partner. The larger number of items in the former condition likely made it a more powerful test to detect menstrual cycle shifts.

Hypothesis two was also supported in that women in the sample displayed the PSTS (Oinonen, Klemencic, & Mazmanian, 2008); during the periovulatory phase, unrestricted women showed a tendency to decrease their willingness to have a one-night stand (i.e., a periovulatory shift away from one's typical strategy). As mentioned, research on menstrual cyclicity has not generally explicitly focused on proceptive versus receptive behaviours; often the behaviour examined includes elements of both constructs. The results from this study suggest that increased receptivity is not synonymous with increased proceptivity, at least not for all women. This variability in women's proceptive behaviour across the cycle as a function of sociosexuality may explain inconsistent findings in past research where women's sociosexuality was not controlled or examined. Although women have previously been found to report an increase in sexual desire during the periovulatory phase (e.g., Dennerstein et al., 1980; Garver-Apgar, Gangestad, & Thornhill, 2008), there is mixed evidence regarding sexual behaviour, with some research showing a corresponding increase in sexual activity with one's long-term partner (e.g., Adams, Gold, Burt, 1978; Bullivant. et al, 2004), some research showing no corresponding increase in sexual activity with a partner (e.g., Bancroft et al., 1983), and some research actually demonstrating a decrease in sexual activity at this time (e.g.,

Harvey, 1987). Indeed, research has not identified a "typical" shift that can be said to characterize the sexual expression of all women across the menstrual cycle (e.g., Fisher & Cox, 2009; Meuwissen & Over, 1992; Regan, 1996).

Past research on women's "proactive" mating behaviours have not always clearly been proceptive behaviours. For example, women dressing more provocatively and wearing more ornamentation during the periovulatory phase (Haselton et al., 2007) could be seen as a proactive behaviour, since women are proactively attempting to increase their mate value relative to other women. Alternatively, it could be seen as a way to advertise their receptivity; women may engage in any number of ways to make the likelihood of a male approaching more likely, for example by going to social events where men are likely to be (Haselton & Gangestad, 2006), by flirting more (Cantu et al., 2014; Flowe, Swords, & Rockey, 2012), or by wearing more make-up (Gueguen, 2012). Women arguably advertise their receptivity in subtle and subconscious ways; for example, their dancing style and gait are rated as more attractive by men when they are in the follicular phase as compared to the luteal phase (e.g., Fink, Hugill, & Lange, 2012; Miller & Tybur, 2007; Provost, Quinsey, & Troje, 2007). Thus, previous research has rarely been explicit in terms of examining menstrual cyclicity in proceptive versus receptive mating behaviours. A more explicit focus on these two categories of mating behaviour in future studies may help us to better understand the role of the menstrual cycle and conception likelihood in mating behaviour.

This is the first study to explicitly examine whether or not phase effects in sexual behaviour are driven by proceptivity, receptivity, or both. These results clearly indicate that the menstrual cycle phase effect is driven by an increase in receptive behaviour

during the periovulatory phase for women overall. However, a periovulatory peak in proceptive behaviour for restricted women also contributes to the overall periovulatory mating behaviour peak. Notably, the effect sizes found when using the exclusively heterosexual subsample of women were medium to large, not only by conventional standards (e.g., Cohen, 1988), but also compared to the small to medium effects found in other research examining shifts across the menstrual cycle (e.g., Durante, Li, & Haselton, 2008; Gangestad, Thornhill, & Garver-Apgar, 2010a; Gangestad, Thornhill, & Garver-Apgar, 2010b; Gueguen, 2009a; Gueguen, 2009b; Haselton & Gangestad, 2006; Haselton et al., 2007; Larson, Haselton, Gildersleeve, & Pillsworth, 2013; Larson, Pillsworth, & Haselton, 2012; Oinonen & Mazmanian, 2007; Pillsworth & Haselton, 2006). Thus, results from this study suggest that women's receptive behaviour peaks during the periovulatory phase, supporting hypothesis one.

Hypothesis three was not supported in that it does not appear that self-rated attractiveness is a mechanism promoting the PSTS. Women's self-rated attractiveness did not shift across the menstrual cycle, regardless of sociosexual orientation. Further, women's self-rated attractiveness was not significantly different for restricted women as compared to unrestricted women; women overall rated their attractiveness very similarly.

Previous research in the area of female attractiveness and sociosexuality has been mixed (see Buss & Shackelford, 2008; Clark, 2004; Honekopp et al., 2007; Lukaszewski, Larson, Gildersleeve, Roney, & Haselton, 2014; Mikach & Bailey, 1999; Penke & Asendorpf, 2008; Perilloux, Cloud, & Buss, 2013; Stillman & Maner, 2009). Some research has suggested that attractiveness in women is positively correlated with number of sex partners (e.g., Honekopp et al., 2007; Lukaszewski, Larson, Gildersleeve, Roney,

& Haselton, 2014; Penke & Asendorpf, 2008; Perilloux, Cloud, & Buss, 2013) yet has been found to be unrelated to sociosexuality (e.g., Clark, 2004; Lukaszewski et al., 2014; Perilloux et al., 2013; Stillman & Maner, 2009). Given the mixed research in the area, the possibility hypothesized here is that perhaps self-rated attractiveness may function differently for women depending on their sociosexuality. This was hypothesized partly because of the research suggesting that there are two "types" of shifts or patterns of symptoms/behaviours across the menstrual cycle related to many health variables (see Kiesner & Martin, 2013), which could possibly explain some of the contradictory research in the area of self-rated attractiveness and sociosexuality. The results from this study, however, suggest that women, regardless of sociosexual identity, rate themselves equivalently on attractiveness across the cycle and further, self-rated attractiveness does not shift across the menstrual cycle. As such, it is therefore unlikely that self-rated attractiveness is a factor influencing the PSTS.

Many other underlying variables are potential candidates for playing a role in the mechanisms underlying the PSTS. For example, risk taking is known to be associated with increased testosterone (Peper, Koolschijn, & Crone, 2013; Stanton, Liening, & Schultheiss, 2011), which is highest in the periovulatory phase. However, differential shifts in risk-taking as a function of sociosexuality have yet to be explored. It may also be that differential shifts in positive or negative affect across the cycle may underlie the shifts in proceptivity. That is, peaks in positive affect may drive peaks in proceptivity. Of course, this would suggest the existence of two groups of women who are differentially sensitive to hormones or hormonal shifts that play a role in positive affect. Given that

women have been shown to respond differently to identical shifts in testosterone (Bancroft & Graham, 2011), this is an area that requires further investigation.

Differential Cyclicity in Proceptivity as a Function of Sociosexuality

Generally, it was hypothesized that receptive sexual behaviours were more related to estrous sexuality (i.e., sexuality aimed at attaining genetic benefits) whereas proceptive behaviours were more related to extended sexuality (i.e., sexuality aimed at attaining non-genetic benefits) (see Thornhill & Gangestad, 2008). Since estrous sexuality evolved before extended sexuality and since estrous sexuality has major implications for the genetic quality of offspring, it was expected that women would be similar in terms of receptive sexual behaviours. However, it was expected that proceptive sexual behaviours would be different between the groups because, by definition, restricted and unrestricted women are guided by different sexual strategies. Restricted women focus their efforts more on a single long-term partner and the evolution of concealed ovulation allowed women to maintain the support of a mate over the long-term by exchanging exclusive sexual access. The "father-at-home" theory of concealed ovulation (Alexander & Noonan, 1979) suggests that because men were unaware of when their partner was ovulating, they had to "stay home" to impregnate their partner and to mate-guard against other men. Women's restrictiveness would have increased men's paternity certainty and thus increased his likelihood of investing over the long-term and so any EPC on the part of the woman would have been detrimental to her sexual strategy and only would have been beneficial in the context of conception (i.e., when she was ovulating).

The unrestricted pattern can be adaptive for women when one considers the "many-fathers" theory of concealed ovulation (Hrdy, 1981). Unrestricted women could

have gained more benefits from several men than perhaps could be gained from any single man. Such a strategy would rely on the exchange of sexual access for resources, probably on an on-going or long-term basis. Since such a strategy may have increased chances of pregnancy, women employing this strategy place heavy emphasis on genetic quality (e.g., Provost, Kormos, Kosakoski, & Quinsey, 2006; Simpson & Gangestad, 1992). Research into promiscuous animal species demonstrates that females become less proceptive and more choosy when conception likelihood is high (Hrdy, 1981; Stumpf & Boesch, 2005) and the results from this study suggest that modern unrestricted women continue to exhibit a periovulatory decrease in proceptivity.

Related to this, another reason to suppose that unrestricted women would become less proceptive during the periovulatory phase in general (but with strangers in particular) is because an unrestricted woman might be (unconsciously) reserving sexual access during this time for those men who genuinely like her and who are willing to spend energy pursuing her even when she is not proactively seeking them out, as she might be more likely to do during the luteal phase of the menstrual cycle. Such a strategy would increase the likelihood that unrestricted women would conceive with men who were actually likely to provide some ongoing resources into the future. The results from this study in general support the use of different sexual strategies by restricted and unrestricted women at different menstrual cycle phases.

In their study looking at proceptive and receptive mating behaviours as a function of sociosexuality, Seal and colleagues (1994) found that women were more likely to engage in “cheating” behaviour when they were the passive player rather than the active player, and that when women were pursued, sociosexuality was not found to be related to

behavioural indicators of sexually receptive behaviours. The results from their study might support the hypothesis that perhaps women as a whole are similar in terms of their receptive sexual behaviours towards socially visible men and that group differences between restricted and unrestricted women might be driven by differences in proceptive sexual behaviours. It is important to note, however, that the study done by Seal and colleagues (1994) was examining infidelity in individuals who were in committed dating relationships and the present study was looking at sexual behaviour in new or potential relationships, regardless of present relationship status. It is also important to note that in the present study, although unrestricted women became less proceptive in the periovulatory, their receptivity at the periovulatory phase was the highest rated likelihood of any sexual behaviour. Thus, unrestricted women are still, arguably, the most likely to engage in an EPC at this time.

The Periovulatory Sociosexuality Tactic Shift (PSTS; Oinonen, Klemencic, & Mazmanian, 2008) has been previously documented with respect to women's interest in a one-night stand sexual encounter. The present study lends further support for the PSTS theory as an overall interaction between cycle phase and sociosexuality was found. The present study clarifies the PSTS, however, in that the results suggest that a periovulatory increase in receptive behaviours occurs for all women, and that restricted and unrestricted women show a periovulatory shift in their proceptive behaviours that is in the direction away from their primary strategy.

Hormonal Mechanisms Underlying Proceptive and Receptive Sexual Behaviours

A plausible explanation for the periovulatory peak in receptive mating behaviour and the interaction between sociosexuality and menstrual cycle phase for proceptive

mating tactics involves hormonal mechanisms. As mentioned earlier, female sexuality in most species (and in mammals in particular) is largely driven by hormonal shifts (Thornhill & Gangestad, 2008) with females typically engaging in mating behaviours only during highly fertile periods. Results from this study demonstrate that women retain many aspects of estrous sexuality (i.e., the observed periovulatory peak in receptive mating behaviours) and despite having evolved different mechanisms to engage in extended sexuality, they continue to be quite similar in terms of their expression of estrous sexuality (i.e., receptivity to men with good genes when sex could result in pregnancy). The genetic and reproductive benefits of estrous sexuality are well established (see Thornhill & Gangestad, 2008).

Regardless of the mechanism, it is curious that one menstrual cycle phase (with a particular configuration of several hormones) would have different effects on proceptive and receptive mating behaviours and that they would differ for restricted and unrestricted women. However, a recent study by Piekarski and colleagues (2013) provides evidence of hormones having differential effects on female sexual motivation in rodents. In their study of hamsters, the administration of a gonadotropin inhibitory hormone decreased female proceptive sexual behaviours (as measured by vaginal scent markings and proximity to male cage) but had no effect on female receptive sexual behaviours (as measured by lordosis position). Similarly, food restriction has been found to decrease female sexual motivation (i.e., proceptivity) but not sexual receptivity (Klingerman, Patal, Hedges, Meisel, & Schneider, 2011). Such findings provide further evidence that proceptive and receptive mating behaviours are driven by different hormonal mechanisms or can be differentially affected by hormones.

Although proceptive and receptive mating behaviours may be mediated by different hormonal processes (Klingerman et al., 2011; Piekeraski et al., 2013), it remains unclear why different hormonal processes would be related to different shifts for restricted compared to unrestricted women. Although a certain degree of individual variability is expected between women, women in this study did not shift randomly but rather they predictably demonstrated the periovulatory sociosexuality tactic shift.

The first factor to consider is estradiol, given the importance it has been shown to have for the sexual motivation of females across species (Thornhill & Gangestad, 2008). Estrogen is important in mood regulation and has been related to increases in positive emotions in women (e.g., Stahl, 2005). However, some research has also shown that estrogens are related to negative emotional states in women (e.g., Paus, Keshavan, & Giedd, 2008). Robins, Trzesniewski, Tracy, Gosling, and Potter (2002) further argue that women's self-esteem across the lifespan is negatively related to estrogens, since female self-esteem is high during childhood, declines during adolescence, is at its lowest from about 18 to 22 years of age, and remains low until the age when women typically begin menopause. Fluctuations in self-esteem across the menstrual cycle provide further support that women's self-esteem is negatively related to estrogens (Hill & Durante, 2009).The authors argue that lowered self-esteem at this phase (i.e., ovulation) motivates women to increase their attractiveness at a time when doing so would have the most positive effect in terms of attracting the best genetic mate. This research suggests that there might be a hormonal mechanism that underlies a shift in self-esteem that corresponds with conception likelihood. Given that some women experience anti-depressant-like effects with the administration of estradiol, however, suggests that

estradiols may function to increase some women's interest in sex and sexual receptivity (Stahl, 2005). Thus, both the mood elevating and mood decreasing theories of estradiol could help to increase sexual motivation via different pathways.

Further lending support for the idea that estrogens might be negatively related to mood (and by extension, sexual motivation) comes from DeSoto, Geary, Hoard, Sheldon, and Cooper (2003). DeSoto and colleagues discussed the relationship between Borderline Personality Disorder (BPD) and estrogens in that BPD develops more frequently in women, develops during adolescence (when estrogen levels begin to rise), becomes least well controlled in the perimenopausal phase (when estrogen levels are fluctuating widely), and (for naturally cycling women) symptoms within a menstrual cycle become most pronounced when estrogen levels begin to rise. Given that some women seem to experience negative emotions as a result of high levels of estrogens, it perhaps could be speculated that in some individuals, high estrogen levels result in a different phenotypic expression of various behaviours. In the present study, peaks in estradiol for unrestricted women may interact with a second (unknown) variable to cause a slight reduction in proceptive behaviours.

Rather than different sensitivities to estrogens, perhaps it is different sensitivities or responses to low progesterone that cause some women to become less proceptive during the periovulatory phase. Progesterone is released during periods of stress and generally functions as a GABA inhibitor in children and adults of both sexes (Shen et al., 2007); it is believed to have an anxiolytic effect as most GABA receptors for progesterone initiate calming effects similar to those of alcohol or benzodiazepines. However, there is one type of GABA receptor (i.e., the $\alpha4\beta2\delta$ $GABA_A$ receptor) that

serves to increase (rather than decrease) anxiety and for reasons that are not entirely clear, the number of these receptors increases dramatically during adolescence before receding again in early adulthood (Shen et al. 2007). Consequently, progesterone has the effect of reducing anxiety in children and adults, but in adolescents it does just the opposite. Although completely speculative, it is theoretically possible that for some women, progesterone might continue to cause an increase, rather than a decrease, in anxiety for some women; thus it could be that restricted women experience more anxiety in the luteal phase, and this might correspond to a decrease in proceptive behaviours relative to phases when progesterone is low. However, this idea does not fit with research cited above, suggesting that increased anxiety (as measured by self-esteem) might actually be the precipitating factor in women's sexual motivation (Hill & Durante, 2009), whereby women are motivated to form relationships with men more so when they are likely to conceive, thereby easing their anxiety. Alternatively, unrestricted women could engage in more proceptive behaviours during the luteal phase when their progesterone is higher because of the calming effect of progesterone.

Again there is no clear research suggesting that progesterone has differential effects on women depending on individual differences (like sociosexuality). However, there is some research suggesting that a minority of women are particularly sensitive to hormonal changes during the premenstrual phase and experience more physical and emotional symptoms as they approach ovulation (e.g., Reed, Levin, & Evans, 2008). It could be speculated, then, that because there is a group of women who experience negative emotional and physical symptoms in the follicular phase, it is also possible that there is a group of women whose sexual motivation also decreases during this menstrual

cycle phase. Interestingly, a recent study in our lab suggests that when cluster analysis is used to differentiate between women who have experienced many hormonal symptoms across their lifespan (e.g., premenstrual symptoms, menopause symptoms) versus those who did not experience many such symptoms, the group of women with many symptoms also had a much lower sex drive across the lifespan (Pope, Mazmanian, Oinonen, & Stone, unpublished manuscript). Thus, it is possible that hormonal sensitivity and sex drive are associated and that this association evolved as a result of individual differences in women's mating strategies.

Perhaps the most convincing argument for hormonally different effects on women's sexual behaviour comes from research looking at the relationship between testosterone and women's sexual motivation. Bancroft and Graham (2011) speculated that a minority of women might be dependent on testosterone for their sexual interest and arousability, as is the case for men. Most women are considered to be sensitive to testosterone and can process enough of the hormone even when the hormonal levels are quite low. For most women then, a substantial drop in testosterone (as is what happens when one begins using most OCs) is not related to a corresponding decrease in sexual desire or arousability. However, Bancroft and Graham (2011) speculate that a minority of women are relatively less able to process testosterone, and consequently are sensitive to changes or drops in testosterone. This theory might help explain why a minority of women experience negative emotional side effects, reduced sexual interest, and reduced sexual arousability as a side effect of oral contraceptive use (Sanders, Graham, Bass, & Bancroft, 2001). Again, it is theoretically possible that underlying hormonal differences in sensitivities are related to the sexual expression of women.

There are several lines of research suggesting different hypotheses for the role of hormones in mating behaviours but the relationship is complex and the mechanisms by which they operate are even less well understood. The results from this study suggest that estrous sexuality (i.e., receptivity to attractive men) is likely hormonally mediated and that the relationship between hormones and estrous sexuality is less variable between women. However, the role of hormones in proceptive behaviour is much less understood and this may fit with several lines of research suggesting that hormones can generally have different effects in different women (e.g., Bancroft & Graham, 2011; DeSoto et al., 2003; Paus, Keshavan, & Giedd, 2008; Reed, Levin, & Evans, 2008; Robins et al., 2002; Sanders et al., 2001; Shen et al., 2007). The possibility that sociosexuality is related to these variables is speculative and further research is needed to clarify the role of sociosexuality in proceptive mating behaviours across the menstrual cycle for women.

Sexual Orientation and Periovulatory Peaks in Mating Behaviour

Although the sample of women displayed the predicted PSTS (i.e., a periovulatory peak in receptive mating behaviours and a multivariate sociosexuality group X menstrual cycle phase effect), the univariate group x phase effect for proceptive behaviour did not reach significance. However, the univariate interaction between group and phase was significant for proceptive behaviours when the analyses were re-ran using an exclusively heterosexual group of women. Thus, the hypotheses were fully supported only when using a group of women who were homogenous in terms of sexual orientation.

The significant differences between exclusively heterosexual and variably heterosexual women may be relevant here (although the small sample sizes needs to be considered). Exclusively heterosexual women had significantly lower scores on the SOI

(i.e., more restricted sociosexuality) and reported less frequent masturbation than those women who expressed any sexual orientation towards women. Exclusively heterosexual women also showed a trend for lower scores on the STMO and to have engaged in fewer "cheating" behaviours. The results from this study provide indirect support for the idea that there may be different hormonal mechanisms involved in the sexual behaviours in women of different sexual orientations; these results suggest that having any sexual orientation towards women is also related to other sexual behaviour that is considered less "female typical" or more "male typical" (e.g., lower levels of restrictedness). Alternatively, unrestricted individuals may be more sexually fluid in general and able to adopt different mating strategies or have different partner preferences/orientations depending on the situation. Further research is needed to clarify the relationships between sexual orientation, sociosexuality, and mating behaviours across the menstrual cycle. For example, future research could examine how women's same-sex sexual experiences (regardless of sexual orientation) is related to this ovulatory shift.

Study Strengths and Limitations

This study was the first to independently examine women's proceptive and receptive mating behaviours across the menstrual cycle using a common metric for both in order to compare their relative contributions to total mating behaviours. The within-subjects design allowed women to act as their own controls, which results in increased power to detect any shift across the menstrual cycle. The strict and multiple criteria around menstrual cycle testing (e.g., LH testing, reverse count method) allowed for increased confidence that the women in this study were tested during the appropriate menstrual cycle phase. Using a priori definitions of how menstrual phase would be

determined addresses a general criticism of menstrual cycle research (see Harris, Pashler, & Mickes, 2014).

Another strength of this study was that comparisons could be made between what women report when imagining an ideal partner and what they report when considering photographs of actual attractive men. The results suggest that external stimuli (e.g., pictures of attractive men) may be necessary to best elicit women's periovulatory shifts in short-term sexual strategies or preferences.

One limitation of this study was the size and the makeup of the sample. Although many women took part in the study, getting sufficient women tested within the appropriate menstrual cycle phases proved to be quite challenging and as a result, the sample size was not large. Despite this, support was found for the hypotheses, some of which demonstrated a large effect size. Furthermore, the effects were stronger with the smaller, more homogenous (and arguably more appropriate) sample.

Another limitation regarding this sample was that the women were young (24.10 years old) and as such, might not have had the time or opportunity to engage in the variety of sexual behaviours or partners that an older sample may have had. Perhaps related to age, most of the participants were not in long-term relationships and it is possible that the development of a dual-mating strategy may be less established in the sample than it might have been in an older sample. Thus, while the present findings are likely generalizable to other female heterosexual university students in their early to mid-20s, the findings need to be replicated in other samples of women. It is possible, however, that the PSTS might become even more pronounced in an older sample of

women, as hormonal shifts across the menstrual cycle tend to become most dramatic around the age of 28 (Gronowski & Landau-Levine, 2001).

Another possible limitation of this study was the operational definition of "proceptive mating behaviours". Proceptive behaviours were defined very broadly in terms of actively engaging in some behaviour (e.g., ask a man to dance, buy him a drink). As outlined above, however, the distinction between proceptive and receptive is not always clear. For example, dressing in provocative clothing could be seen as a proceptive behaviour (because one is actively dressing in a certain way) but it could also be considered a receptive behaviour (since the function of dressing in revealing clothing might be to advertise one's receptivity). That each item was measured in both a proceptive and receptive manner, however, helped clarify the ambiguity between proceptive and receptive mating behaviours.

Another complicating factor relates to the social scripts that continue to exist today suggesting that men are the "pursuers" and women are the "pursued". For example, men (more so than women) might be expected to ask the other to dance, to buy the other a drink, or to initiate a first kiss. Despite massive changes in gender roles and expectations over the past 50 years, there is still clear evidence that men are expected to initiate sexual relationships (Eaton & Rose, 2011; Serewicz & Gale, 2008). These social scripts or beliefs about such gender roles were not examined here. Again, there are numerous factors beyond individual differences and hormonal mechanisms that affect the sexual expression of women.

Future Directions

The first and most obvious suggestion for future research in this area is for a replication study with a larger sample. The replication sample would ideally have a good representation of women from across the sexual orientation spectrum and more data would be collected about any previous same-sex sexual factors (e.g., behaviours, attractions, fantasies). This would allow for a more concrete determination of the strength of the PSTS in women of different sexual orientations. It would also be ideal to take measurements of prenatal androgen exposure markers, for example through 2D:4D measurements. Measuring mood and other emotional and physical variables across the menstrual cycle would also help clarify which women experience symptoms at which menstrual cycle phase. Including women with PMDD and women who have experienced negative side effects from OC use would be particularly important to include in a replication study, as these groups of women may provide further information regarding the role of hormonal shifts in women who have shown a history of sensitivity to hormones. Directly measuring hormones (e.g., estradiol, progesterone, testosterone) and hormone receptor gene polymorphisms could help determine whether women showing the ovulatory shift (or different degrees of the shift) differ on these hormonal variables.

The second direction for further research is around the differences between proceptive and receptive mating behaviours and clarifying what type of behaviour falls into each respective category. It would also be fruitful to clarify how restricted versus unrestricted women compare when assessed for behaviours known to shift across the menstrual cycle, such as the tendency to wear more revealing clothes or the increased intra-sexual competition while ovulating.

Another direction for future research is to further examine the sexual and hormonal differences between exclusively heterosexual women and women who report any same-sex orientation. A growing body of research is suggesting that women's sexual orientation is a fluid construct (e.g., Diamond & Wallen, 2007). In this study, only 76% of women identified as having an exclusively heterosexual orientation and this dropped to 68% when romantic interests were queried (on a 9-point scale ranging from '*only attracted to males*' to '*only attracted to females'*). Further, many sexually relevant differences emerged when those women who identified as exclusively heterosexual were compared to those who identified as variable heterosexual (e.g., variably heterosexual women had higher scores on the SOI, reported less attendance at religious activities, and reported more frequently engaging in masturbation, and there was a trend for variably heterosexual women to be more unrestricted on the MDSOI).

The last proposed direction for future research is to expand these results (which focused on short-term relationships with a potential new partner) to sexual behaviours with men that the participants actually know (either from the woman's environment or using commonly known men such as celebrities, politicians, or fictional characters from popular media). As in the study by Oinonen and colleagues (2008), the present study only used examples of men who were unknown to the participants. Consequently, participants had very little knowledge of the man's personality or behavioural tendencies. Recent research suggests that medium-term relationships (sometimes referred to as 'friends with benefits' or 'booty calls') are more common than are one-night stands (Jonason, Li, & Cason, 2009), suggesting perhaps that women are selecting sexual partners based on variables other than (or in addition to) physical attractiveness. Further, the general

unrestricted pattern of sexual behaviour fits much better in a medium-term context than it does in a short-term context, especially when conception likelihood is high. This is important to consider because the magnitude of resources a woman can receive from a sexual partner in the case of pregnancy is generally related to how certain the male believes himself to be the father of the offspring. In the event that copulation leads to pregnancy, women could arguably gain more resources from a frequent or repeat sexual partner than from a new sexual partner; this would motivate unrestricted women to engage in sex with unknown men primarily during low-fertility phases since paternal certainty increases with the number of times the male has mated with the female. As such, it would be beneficial to examine women's reported sexual behaviour in the context of different relationships, such as with current partners, past partners, friends-with-benefits relationships, when considering men one knows but with whom they have not had a sexual relationship, and strangers.

In summary, the present study provides support for the periovulatory sociosexual tactic shift (PSTS) theory (Oinonen, Klemencic, & Mazmanian, 2008) and expands it to suggest that all women experience a periovulatory increase in receptive behaviour and a periovulatory shift away from their primary sociosexual orientation in terms of their proceptive behaviour.

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Appendix A

Screening Questionnaire

Date: (year/month/day) ___/___/___

Subject # _____

1. Date of Birth (year/month): _____ Age:_____

2. Sex (please circle): **Male** **Female**

3. Are you currently pregnant (please circle): **YES** **NO** **MAYBE**

4. Are you currently using any form of hormonal contraceptive (e.g., "the pill", "the patch", Depo Provera, oral contraceptives, etc.) **YES** **NO**
   If YES, what hormonal contraceptive are you taking?
   _____

5. Have you ever taken any form of hormonal contraceptive? **YES** **NO**
   If you have **previously taken a hormonal contraceptive** but are not taking them right now, how many years and months has it been **since you last took hormonal contraceptives**?
   _____years and_____months

6. Are you currently taking any medications? (please circle) **YES** **NO**
   If YES, what medications are you taking? (please list)?
   _____
   _____
   _____

7. Please list any medical or psychological conditions that you have been diagnosed with (e.g. hypothyroidism, depression, asthma, cancer, diabetes, etc.):
   _____
   _____
   _____

8. Please check the box which best describes your sexual orientation:

   [ ] Exclusively heterosexual
   [ ] Predominantly heterosexual (only incidental same-sex orientation)
   [ ] Predominantly heterosexual (but more than incidental same-sex orientation)
   [ ] Bisexual - Equally opposite-sex and same-sex orientation
   [ ] Predominantly homosexual (but more than incidental opposite-sex orientation)
   [ ] Predominantly homosexual (only incidental opposite-sex orientation)
   [ ] Exclusively homosexual

9. Please indicate your romantic interests:

Only attracted to males			Equally attracted to males and females			Only attracted to females		
1	2	3	4	5	6	7	8	9

10. Check the box that best describes your current relationship status:

[ ] married or living with partner [ ] one partner, but living apart
[ ] no partner (single) [ ] more than one partner
[ ] casually dating [ ] other: _____

11. If you are currently in a steady relationship, how long have you and your partner been together (in years and months)? _____ years and _____ months.

12. To your knowledge, have you ever been pregnant? **YES** **NO**

If YES, how many times have you been pregnant**?** _____

If YES, when did your last pregnancy end? _____

13. Do you have any biological children? **YES** **NO**

If YES: How many? _____

How old are they? _____

14. What is the average length of your menstrual cycle right now (i.e., How many days are there from the first day of one period to the day before your next period – most people range between 25 and 35)? _____ days

15. What is your average length of menstruation/bleeding **when you are not taking hormonal contraceptives**? (i.e., how many days does your period last? Most women's periods last between 3 and 7 days.) _____ days

16. Which statement best describes your menstrual cycle **right now**? (Check the box with an "X" beside the appropriate response.)

[ ] I never have my period.
[ ] My period is **very unpredictable**. Sometimes very few days pass before I get my next period, sometimes months pass before I get my next period.
[ ] My period is **somewhat unpredictable**. I usually get my period within four to seven days of when I expect it.
[ ] My period is **somewhat predictable**. I usually get my period within two or three days of when I expect it.
[ ] My period is **very predictable**. I can predict within one day when my next period will start.

.

17. Are you currently breast-feeding or lactating (please circle)? **YES** **NO**

The next few questions ask about dates of your last and next period. Please use the calendar to help you remember/predict your menstrual cycle.

December 2008

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2009

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2009

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2009

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2009

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2009

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

18. When did your last period start (month/day)? _____When did your last period end (month/day)?_____

19. How confident are you that the date your last period started is accurate? (Circle the best response)

0%		25%		50%		75%		100%
0	1	2	3	4	5	6	7	8

20. When do you expect your next period to start (month/day)? _____

21. How confident are you that your period will start on that day? (Circle the best response)

0%		25%		50%		75%		100%
0	1	2	3	4	5	6	7	8

22. Are you menopausal? **YES** **NO**

23. How old were you when you first started menstruating (started your period)? **_____ years old**

24. Approximately how often do you attend religious services (please circle one)?

1. Every day
2. 2-3 times a week
3. Once a week
4. Every other week
5. Once a month
6. Once every few months
7. Once or twice a year
8. I only attend religious services for special occasions (e.g., only at Christmas, only for weddings/funerals)
9. I never attend religious services

25. Besides religious services, how often do you take part in activities at a place of worship (e.g., choir, bible studies)?

1. Every day
2. 2-3 times a week
3. Once a week
4. Every other week
5. Once a month
6. Once every few months
7. Once or twice a year
8. I only attend religious services for special occasions (e.g., only at Christmas, only for weddings/funerals)
9. I never attend religious services

26. Please indicate the extent to which you wish to avoid pregnancy at the current time (please circle)?

1	2	3	4	5	6	7

Not at all

Extremely

Appendix B

Demographics

Subject # _____
Session# _____

1. Date: (year/month/day) ___/___/___

2. How old are you today (in years and months)? ____years ____months

3. How would you best describe your ethnicity (e.g., British, Aboriginal, Finnish, Chinese, etc)?

_____

4. Please check the box that best describes the **highest level of education** that **your mother** completed:

[ ] some elementary [ ] completed high school [ ] some university
[ ] completed grade 8 [ ] some college [ ] completed a university degree
[ ] some high school [ ] completed college [ ] some graduate studies
[ ] completed a graduate degree

5. Please check the box that best describes the **highest level of education** that **your father** completed:

[ ] some elementary [ ] completed high school [ ] some university
[ ] completed grade 8 [ ] some college [ ] completed a university degree
[ ] some high school [ ] completed college [ ] some graduate studies
[ ] completed a graduate degree

6. What is **your** highest level of education?

[ ] some elementary [ ] completed high school [ ] some university
[ ] completed grade 8 [ ] some college [ ] completed a university degree
[ ] some high school [ ] completed college [ ] some graduate studies
[ ] completed a graduate degree

7. What is your height? _____ (feet & inches) or _____ (cm)

8. What is your weight? _____ (pounds) or _____ (kg)

Appendix C

Hormonal/Reproductive Questions

Subject # _____
Session# _____

1. Are you currently pregnant (please circle) **YES** **NO** **MAYBE**

2. Are you currently using any form of hormonal contraceptive (e.g., "the pill", "the patch", Depo Provera, oral contraceptives, etc.) **YES** **NO**

   If yes, what hormonal contraceptive are you taking? _____

3. Are you currently taking any medications? (please circle) **YES** **NO**
   If YES, what medications are you taking? (please list)

   _____
   _____
   _____
   _____

4. Please list any medical or psychological conditions that you have been diagnosed with (e.g. hypothyroidism, depression, asthma, cancer, diabetes, etc.):

   _____
   _____
   _____
   _____

The next few questions pertain to your last and next period. Please refer to the following calendar.

December 2008

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2009

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2009

S	M	T	W	T	F	S
1	2	3	4	5	6	7

March 2009

S	M	T	W	T	F	S
1	2	3	4	5	6	7

8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2009

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2009

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

5. When did your last period start (month/day)? _____When did your last period end (month/day)?_____

6. How confident are you that the first day of your last period is accurate? (Circle the best response)

0%		25%		50%		75%		100%
0	1	2	3	4	5	6	7	8

7. When do you expect your next period to start (month/day)?_____

8. How confident are you that your period will start on that day? (Circle the best response)

0%		25%		50%		75%		100%
0	1	2	3	4	5	6	7	8

9. Are you currently menstruating (please circle)? **YES NO**

   If **YES**, what day of bleeding are you on today (day 1 is the first day of bleeding)?

   DAY _____

10. What day of your menstrual cycle are you on today? (Day 1 of the menstrual cycle is on the first day of bleeding. If your period started on January 1st, and today is January 25th, you would be on day 25 of your menstrual cycle. Please refer to the calendar above.)

    DAY _____

Appendix D

General Relationship Questions

Subject # _____
Session# _____

1. Check the box that best describes your current relationship status:
   - [ ] married or living with partner
   - [ ] no partner (single)
   - [ ] casually dating
   - [ ] one partner, but living apart
   - [ ] more than one partner
   - [ ] other: _____

2. How many romantic relationships have you been in that have lasted more than 3 months? _____

3. Have you ever been divorced (circle one)? **YES** **NO**

4. Have you ever been in a co-habitating relationship that ended (i.e., were you ever living with a partner, but then broke up)?
   YES **NO**

5. What is the longest romantic relationship you have been in? _____years____months

6. Please indicate how important it is to you that your romantic partner possesses the following traits using the following scale.

1	5	9
Not at all important	Neutral	Extremely important

1. Kindness and understanding	1	2	3	4	5	6	7	8	9
2. Faithfulness and loyalty	1	2	3	4	5	6	7	8	9
3. Stable personality	1	2	3	4	5	6	7	8	9
4. Responsibility	1	2	3	4	5	6	7	8	9
5. Sense of humour	1	2	3	4	5	6	7	8	9
6. Similar values and beliefs	1	2	3	4	5	6	7	8	9
7. Qualities of a good parent	1	2	3	4	5	6	7	8	9
8. Sex appeal	1	2	3	4	5	6	7	8	9
9. Physical attractiveness	1	2	3	4	5	6	7	8	9
10. Social status	1	2	3	4	5	6	7	8	9
11. Financial resources	1	2	3	4	5	6	7	8	9
12. Fun and exciting personality	1	2	3	4	5	6	7	8	9
13. Desire for children	1	2	3	4	5	6	7	8	9
14. Quality of health	1	2	3	4	5	6	7	8	9
15. Intelligence	1	2	3	4	5	6	7	8	9

7. Infidelity can be defined as a person being unfaithful in a committed monogamous relationship. The purpose of this scale is to gain a better understanding of what people think and feel about issues associated with infidelity. There are no right or wrong answers to any of these statements; we are interested in your honest reactions and opinions. Please read each statement carefully, and respond by using the following scale

	1 **Strongly Disagree**			4 Neutral			7 **Strongly Agree**
Please circle your response.							
1. Being unfaithful never hurt anyone.	1	2	3	4	5	6	7
2. Infidelity in a marital relationship is grounds for divorce.	1	2	3	4	5	6	7
3. Infidelity is acceptable for retaliation of infidelity.	1	2	3	4	5	6	7
4. It is natural for people to be unfaithful.	1	2	3	4	5	6	7
5. Online/internet behaviour (e.g., sex chatrooms, porn sites) is an act of infidelity.	1	2	3	4	5	6	7
6. Infidelity is morally wrong in all circumstances regardless of the situation.	1	2	3	4	5	6	7
7. Being unfaithful in a relationship is one of the most dishonourable thing a person can do.	1	2	3	4	5	6	7
8. Infidelity is unacceptable under any circumstances if the couple is married.	1	2	3	4	5	6	7
9. I would not mind if my significant other had an affair as long as I did not know about it.	1	2	3	4	5	6	7
10. It would be acceptable for me to have an affair, but not my significant other.	1	2	3	4	5	6	7
11. I would have an affair if I knew my significant other would never find out.	1	2	3	4	5	6	7
12. If I knew my significant other was guilty of infidelity, I would confront him.	1	2	3	4	5	6	7
13. I would be more likely to forgive my partner for infidelity if I knew it was ‘just sex’.	1	2	3	4	5	6	7

Appendix E

Cronbach Alphas Computed in This Study

Measure	Cronbach's Alpha	*n*
PARMSS, Proceptive Score	.92	63
PARMSS, Receptive Score	.92	63
Short-Term Mating Orientation	.92	60
Long-Term Mating Orientation	.91	61
Previous Sexual Behaviors	.81	49
Sociosexual Orientation Inventory	.63	46
Romantic Partner Attributes Inventory – Parenting Qualities	.81	59
Romantic Partner Attributes Inventory – Social Visibility	.83	61
Attitudes Towards Infidelity	.74	56
Self-Perceived Mating Success Scale	.76	64
Self-Perceived Attractiveness Scale	.77	64
Relationship Assessment Scale	.91	26
Index of Sexual Satisfaction	.95	17
Love Scale	.89	27
Pinney Sexual Satisfaction Inventory – General Satisfaction	.95	34
Pinney Sexual Satisfaction Inventory – Satisfaction with Partner	.86	20
Romantic Partner Attributes Inventory – Parenting Qualities – Current Partner	.80	27
Romantic Partner Attributes Inventory – Social Visibility – Current Partner	.71	27
Social Desirability Scale	.69	59
Big Five – Extroversion	.83	52
Big Five – Agreeableness	.82	53
Big Five – Conscientiousness	.81	49
Big Five – Neurotic	.82	49
Big Five – Openness to Experience	.82	51
Body Esteem Scale – Sexual Attractiveness	.79	57
Body Esteem Scale – Weight	.91	64
Body Esteem Scale – Physical Health Concerns	.81	62

Appendix F

General Sexuality Questions

Subject # _____
Session# _____

1. Have you ever had sexual intercourse? **YES NO**
   If **NO**, please go to item 7.

2. At what age did you first have sexual intercourse? _____

3. Think about the first person you had sexual intercourse with. How long did you and your partner date/know each other for before having sexual intercourse?
   We dated for _____ before having sex
   We knew each other for _____ before having sex

4. During your entire life, with how many partners have you had sexual intercourse with?

   _____

5. With how many different partners have you had sex (sexual intercourse) within the past year?

   _____

6. With how many different partners have you had sex on one and only one occasion?

   _____

7. How many different partners do you foresee yourself having sex with during the next 5 years? (Please give a specific, realistic estimate).

   _____

8. How many men have you performed oral sex on (your mouth on his genitals)?

   _____

9. How many men have performed oral sex on you (his mouth on your genitals)?

   _____

10. How many women have you performed oral sex on (your mouth on her genitals)?

    _____

11. How many women have performed oral sex on you (her mouth on your genitals)?

_____

12. Have you ever deep/tongue/French kissed another person when you were in a steady relationship with someone else (please circle)?

YES **NO**

13. Have you ever 'made out' with someone when you were in a steady relationship with someone else?

YES **NO**

14. Have you ever engaged in oral sex (performed or received) with someone when you were in a steady relationship with someone else?

YES **NO**

15. Have you ever had sex with someone when you were in a steady relationship with someone else?

YES **NO**

16. How often do you masturbate (please circle the most appropriate response)?

1. Never
2. Once every two or three months
3. Once a month
4. Once every two weeks
5. Once a week
6. A few times each week
7. Nearly every day
8. At least once a day

17. What percentage of the time do you reach orgasm when you masturbate?

0%		25%		50%		75%		100%
0	1	2	3	4	5	6	7	8

18. How difficult/easy is it for you to reach orgasm when you masturbate?

Extremely Difficult						Extremely Easy	
1	2	3	4	5	6	7	8

19. What percentage of the time do you reach orgasm when you have sexual relations with a partner?

0%	25%	50%	75%	100%

0 1 2 3 4 5 6 7 8

20. How difficult/easy is it for you to reach orgasm with a partner?

Extremely Difficult 1 2 3 4 5 6 7 8 Extremely Easy

21. How often do you fake orgasms with a partner?

Never 0 1 2 3 4 5 6 7 8 Always

22. In your lifetime, with how many different men have you had skin-to-skin penis-vagina contact? _____

23. How often do you fantasize about having sex with someone other than your current partner (or most recent partner if you are not currently in a romantic relationship)?

1. Never
2. Once every two or three months
3. Once a month
4. Once every two weeks
5. Once a week
6. A few times each week
7. Nearly every day
8. At least once a day

n/a I've never been in a romantic relationship

24. Have you had sexual intercourse in the last three days?

YES NO

If YES, how many times?_____
How many of those times did you initiate the sexual activity? _____
How many of those times did your partner initiate the sexual activity?_____
How many of those times did you and your partner equally initiate the sexual activity? _____

25. Please respond to the following questions.

	1 Strongly Disagree			4 Neutral			7 Strongly Agree
Please circle your response.							
1. I am satisfied with the frequency with which I have sexual	1	2	3	4	5	6	7

intercourse.							
2. I am satisfied that my personal needs are completely met during lovemaking.	1	2	3	4	5	6	7
3. I am satisfied with the amount of time that my partner and I spend together when we make love.	1	2	3	4	5	6	7
4. I am satisfied with the spontaneity of my lovemaking.	1	2	3	4	5	6	7
5. I am satisfied with my ability to make my physical needs known to my partner.	1	2	3	4	5	6	7
6. I am satisfied with the frequency with which I have orgasms.	1	2	3	4	5	6	7
7. I am satisfied with the amount of time my partner and I spend together immediately after intercourse.	1	2	3	4	5	6	7
8. I am satisfied with the quality of the time my partner and I spend together immediately after intercourse.	1	2	3	4	5	6	7
9. I am satisfied with the amount of foreplay involved in my lovemaking.	1	2	3	4	5	6	7
10. I am satisfied with the importance my partner places on lovemaking in the relationship.	1	2	3	4	5	6	7
11. I am satisfied with the times of day and night when my partner and I usually make love.	1	2	3	4	5	6	7
12. I feel that nothing is lacking in my sex life.	1	2	3	4	5	6	7
13. I am satisfied with my capacity for enjoying sex.	1	2	3	4	5	6	7
14. Generally, I am satisfied with my sex life.	1	2	3	4	5	6	7

26. Please respond to the following items.

	1 Strongly Disagree			4 Neutral			7 Strongly Agree
1. I would like to have a romantic relationship that lasts forever.	1	2	3	4	5	6	7
2. I would never consider having a brief sexual relationship with someone.	1	2	3	4	5	6	7
3. I would have to be closely attached to someone (both emotionally and psychologically) before I could feel comfortable and fully enjoy having sex with him or her.	1	2	3	4	5	6	7
4. Sex without love is OK.	1	2	3	4	5	6	7
5. I can see myself settling down romantically with one special person.	1	2	3	4	5	6	7
6. I would consider having sex with a stranger if I could be assured that it was safe and he was attractive to	1	2	3	4	5	6	7

me.							
7. I can imagine myself being comfortable and enjoying 'casual' sex with different partners.	1	2	3	4	5	6	7
8. Sometimes I would rather have sex with someone I did not care about.	1	2	3	4	5	6	7
9. I can imagine myself enjoying a brief sexual encounter with someone I find very attractive.	1	2	3	4	5	6	7
10. I believe in taking sexual opportunities when I find them.	1	2	3	4	5	6	7
11. I am interested in maintaining a long-term relationship with someone special.	1	2	3	4	5	6	7
12. I could easily imagine myself enjoying one night of sex with someone I would never see again.	1	2	3	4	5	6	7
13. I can easily see myself engaging in a long-term relationship with someone special.	1	2	3	4	5	6	7
14. Long-term romantic relationships are *not* for me.	1	2	3	4	5	6	7
15. Finding a long-term romantic partner is *not* important for me.	1	2	3	4	5	6	7
16. I could enjoy sex with someone I find highly desirable even if that person does not have long-term potential.	1	2	3	4	5	6	7
17. I hope to have a romantic relationship that lasts the rest of my life.	1	2	3	4	5	6	7

Appendix G

Relationship and Sexuality Questions for Individuals in a Relationship

Subject # _____
Session# _____

1.. How long have you and your partner been together (in years and months)?
_____ years and _____ months.

2. Is your current relationship the longest relationship you have been in? **YES NO**

3. Have you had sexual intercourse with your current partner? **YES NO**
If **YES,** how long did you and your partner date/know each other before having sexual intercourse?
We dated for _____ before having sex.
We knew each other for _____ before having sex.

4. How often do you fantasize about having sex with someone other than your current dating partner (please circle one)?

1. Never
2. Once every two or three months
3. Once a month
4. Once every two weeks
5. Once a week
6. A few times each week
7. Nearly every day
8. At least once a day

5. Please respond to these questions regarding your current relationship.

	strongly disagree	disagree	neutral	agree	**strongly agree**
1. My partner meets my needs.	1	2	3	4	5
2. In general, I am satisfied with my relationship.	1	2	3	4	5
3. My relationship is very good compared to most relationships.	1	2	3	4	5
4. I sometimes wish I hadn't gotten into this relationship.	1	2	3	4	5
5. This relationship has met my original expectations.	1	2	3	4	5
6. I love my partner.	1	2	3	4	5

7. There are many problems in my relationship.	1	2	3	4	5

6. This questionnaire is designed to measure the degree of satisfaction you have in your sexual relationship with your partner. It is not a test, so there are no right or wrong answers.

	1 Not at all True		3 Neutral		5 Very True
1. I feel that my partner enjoys our sex life.	1	2	3	4	5
2. My sex life is very exciting.	1	2	3	4	5
3. Sex is fun for my partner and me.	1	2	3	4	5
4. I feel that my partner sees little in me except for the sex I can give him/her.	1	2	3	4	5
5. I feel that sex is dirty and disgusting.	1	2	3	4	5
6. My sex life is monotonous.	1	2	3	4	5
7. When we have sex it is too rushed and hurriedly completed.	1	2	3	4	5
8. I feel that my sex life is lacking in quality.	1	2	3	4	5
9. My partner is sexually very exciting.	1	2	3	4	5
10. I enjoy the sex techniques that my partner likes or uses.	1	2	3	4	5
11. I feel that my partner wants too much sex from me.	1	2	3	4	5
12. I think that sex is wonderful.	1	2	3	4	5
13. My partner dwells on sex too much.	1	2	3	4	5
14. I feel that sex is something that has to be endured in our relationship.	1	2	3	4	5
15. My partner is too rough or brutal when we have sex.	1	2	3	4	5
16. My partner observes good personal hygiene.	1	2	3	4	5

17. I feel that sex is a normal function of our relationship.	1	2	3	4	5
18. My partner does not want sex when I do.	1	2	3	4	5
19. I feel that our sex life really adds a lot to our relationship.	1	2	3	4	5
20. I would like to have sexual contact with someone other than my partner.	1	2	3	4	5
21. It is easy for me to get sexually excited by my partner.	1	2	3	4	5
22. I feel that my partner is sexually pleased with me.	1	2	3	4	5
23. My partner is very sensitive to my sexual needs and desires.	1	2	3	4	5
24. I feel that I should have sex more often.	1	2	3	4	5
25. I feel that my sex life is boring.	1	2	3	4	5

7. Please answer the following questions with regard to your current partner.

	1 Strongly Disagree			5 Neutral			9 Strongly Agree		
1. If my partner were feeling badly, my first duty would be to cheer him/her up.	1	2	3	4	5	6	7	8	9
2. I feel that I can confide in my partner about virtually anything.	1	2	3	4	5	6	7	8	9
3. I find it easy to ignore my partner's faults.	1	2	3	4	5	6	7	8	9
4. I would do almost anything for my partner.	1	2	3	4	5	6	7	8	9
5. I feel very possessive toward my partner.	1	2	3	4	5	6	7	8	9
6. If I could never be with my partner, I would feel miserable.	1	2	3	4	5	6	7	8	9
7. If I were lonely, my first thought would be to seek my partner out.	1	2	3	4	5	6	7	8	9
8. One of my primary concerns is my partner's welfare.	1	2	3	4	5	6	7	8	9
9. I would forgive my partner for practically anything.	1	2	3	4	5	6	7	8	9
10. I feel responsible for my partner's well-being.	1	2	3	4	5	6	7	8	9
11. When I am with my partner, I spend a good deal of time just looking at him/her.	1	2	3	4	5	6	7	8	9
12. I would greatly enjoy being confided in by my partner.	1	2	3	4	5	6	7	8	9

13. It would be harder for me to get along without my partner.	1	2	3	4	5	6	7	8	9

8. Please respond to the following questions regarding your current partner.

	1 Strongly Disagree			4 Neutral			7 Strongly Agree
1. I wish my partner was more sensitive to my physical needs when we make love.	1	2	3	4	5	6	7
2. I wish my partner initiated sex more often.	1	2	3	4	5	6	7
3. I wish my partner were more affectionate during foreplay.	1	2	3	4	5	6	7
4. I wish my partner were a better lover.	1	2	3	4	5	6	7
5. I wish my partner could communicate more openly about what he wants in our sexual encounters.	1	2	3	4	5	6	7
6. I wish my partner would make me feel more attractive.	1	2	3	4	5	6	7
7. I wish I were less inhibited when I make love.	1	2	3	4	5	6	7
8. I wish my partner were more loving and caring when we make love.	1	2	3	4	5	6	7
9. I wish my partner were more patient when we make love.	1	2	3	4	5	6	7
10. I wish my partner were more romantic when we make love.	1	2	3	4	5	6	7

9. Please rate your current romantic partner on the following traits. Please rate them as they currently are, not as how you wish them to be.

	1 Extremely **Uncharacteristic** of my partner			5 Neutral			9 Extremely **Characteristic** of my partner		
1. Kindness and understanding	1	2	3	4	5	6	7	8	9
2. Faithfulness and loyalty	1	2	3	4	5	6	7	8	9
3. Stable personality	1	2	3	4	5	6	7	8	9
4. Responsibility	1	2	3	4	5	6	7	8	9
5. Sense of humour	1	2	3	4	5	6	7	8	9
6. Similar values and beliefs	1	2	3	4	5	6	7	8	9
7. Qualities of a good parent	1	2	3	4	5	6	7	8	9

8. Sex appeal	1	2	3	4	5	6	7	8	9
9. Physical attractiveness	1	2	3	4	5	6	7	8	9
10. Social status	1	2	3	4	5	6	7	8	9
11. Financial resources	1	2	3	4	5	6	7	8	9
12. Fun and exciting personality	1	2	3	4	5	6	7	8	9
13. Desire for children	1	2	3	4	5	6	7	8	9
14. Quality of health	1	2	3	4	5	6	7	8	9
15. Intelligence	1	2	3	4	5	6	7	8	9

10. Please rate your current partner on the following scale:

1 Strongly Disagree — 4 Neutral — 7 Strongly Agree

Please circle your response.

1. I find my partner to be physically attractive.	1	2	3	4	5	6	7
2. Women tend to notice my partner.	1	2	3	4	5	6	7
3. My partner receives many compliments from women.	1	2	3	4	5	6	7
4. Women are not very attracted to my partner.	1	2	3	4	5	6	7
5. My partner receives sexual invitations from other women.	1	2	3	4	5	6	7
6. Women are attracted to my partner.	1	2	3	4	5	6	7
7. If my partner were single, he could have as many sexual partners as he desired.	1	2	3	4	5	6	7
8. My partner does not receive many compliments from women.	1	2	3	4	5	6	7
9. My partner is very social/extroverted.	1	2	3	4	5	6	7

11. During your current relationship, have you deep/tongue/French kissed someone other than your current partner?

YES **NO**

12. During your current relationship, have you 'made out' with someone other than your current partner?

YES **NO**

13. During your current relationship, have you engaged in oral sex (performed or received) with a person other than your current partner?

YES **NO**

14. During your current relationship, have you had sexual intercourse with a person other than your current partner?

YES **NO**

15. During your current relationship, have you had skin-to-skin genital-genital contact with someone other than your current partner?

YES **NO**

Appendix H

Other Questionnaires

1. Please read each item and indicate how you feel about this part or function of your own body using the following scale:

	Strong Negative Feelings	Moderate Negative Feelings	Neutral	Moderate Positive Feelings	Strong Positive Feelings
1. Body Scent	1	2	3	4	5
2. Appetite	1	2	3	4	5
3. Nose	1	2	3	4	5
4. Physical Stamina	1	2	3	4	5
5. Reflexes	1	2	3	4	5
6. Lips	1	2	3	4	5
7. Muscular Strength	1	2	3	4	5
8. Waist	1	2	3	4	5
9. Energy Level	1	2	3	4	5
10. Thighs	1	2	3	4	5
11. Ears	1	2	3	4	5
12. Biceps	1	2	3	4	5
13. Chin	1	2	3	4	5
14. Body Build	1	2	3	4	5
15. Physical coordination	1	2	3	4	5
16. Buttocks	1	2	3	4	5
17. Agility	1	2	3	4	5
18. Width of shoulders	1	2	3	4	5
19. Arms	1	2	3	4	5
20. Breasts	1	2	3	4	5
21. Appearance of Eyes	1	2	3	4	5
22. Cheeks/Cheekbones	1	2	3	4	5
23. Hips	1	2	3	4	5
24. Legs	1	2	3	4	5
25. Figure or Physique	1	2	3	4	5

26. Sex Drive	1	2	3	4	5
27. Feet	1	2	3	4	5
28. Sex Organs	1	2	3	4	5
29. Appearance of Stomach	1	2	3	4	5
30. Health	1	2	3	4	5
31. Sex Activities	1	2	3	4	5
32. Body Hair	1	2	3	4	5
33. Physical Condition	1	2	3	4	5
34. Face	1	2	3	4	5
35. Weight	1	2	3	4	5

2. Please respond to the questions on the following scale:

1 Strongly Disagree — 4 Neutral — 7 Strongly Agree

Please circle your response.

1. Members of the opposite sex that I like tend to like me back.	1	2	3	4	5	6	7
2. Members of the opposite sex notice me.	1	2	3	4	5	6	7
3. I receive many compliments from members of the opposite sex.	1	2	3	4	5	6	7
4. Members of the opposite sex are not very attracted to me.	1	2	3	4	5	6	7
5. I receive sexual invitations from members of the opposite sex.	1	2	3	4	5	6	7
6. Members of the opposite sex are attracted to me.	1	2	3	4	5	6	7
7. I can have as many sexual partners as I choose.	1	2	3	4	5	6	7
8. I do not receive many compliments from members of the opposite sex.	1	2	3	4	5	6	7

3. Based on how you are feeling right now, please indicate the extent to which you agree or disagree with the following statements using the scale below:

1 Strongly Disagree — 4 Neutral — 7 Strongly Agree

1. Compared to my peers my face is more attractive.	1	2	3	4	5	6	7
2. I enjoy looking at pictures of myself.	1	2	3	4	5	6	7
3. Most of the time I feel attractive and confident about my appearance.	1	2	3	4	5	6	7
4. I avoid showing others my picture.	1	2	3	4	5	6	7
5. I feel less attractive than most people I see each day.	1	2	3	4	5	6	7
6. Men think I am not very physically attractive.	1	2	3	4	5	6	7

4. Please use this list of common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know of the same sex and of roughly your same age. Please use the following scale.

1	5	9
Extremely Inaccurate	Neutral	Extremely Accurate

1. Active	1	2	3	4	5	6	7	8	9
2. Agreeable	1	2	3	4	5	6	7	8	9
3. Anxious	1	2	3	4	5	6	7	8	9
4. Artistic	1	2	3	4	5	6	7	8	9
5. Assertive	1	2	3	4	5	6	7	8	9
6. Bashful	1	2	3	4	5	6	7	8	9
7. Bold	1	2	3	4	5	6	7	8	9
8. Bright	1	2	3	4	5	6	7	8	9
9. Careful	1	2	3	4	5	6	7	8	9
10. Careless	1	2	3	4	5	6	7	8	9
11. Cold	1	2	3	4	5	6	7	8	9
12. Complex	1	2	3	4	5	6	7	8	9
13. Conscientious	1	2	3	4	5	6	7	8	9
14. Considerate	1	2	3	4	5	6	7	8	9
15. Cooperative	1	2	3	4	5	6	7	8	9
16. Creative	1	2	3	4	5	6	7	8	9
17. Daring	1	2	3	4	5	6	7	8	9
18. Deep	1	2	3	4	5	6	7	8	9
19. Demanding	1	2	3	4	5	6	7	8	9
20. Disorganized	1	2	3	4	5	6	7	8	9
21. Distrustful	1	2	3	4	5	6	7	8	9
22. Efficient	1	2	3	4	5	6	7	8	9
23. Emotional	1	2	3	4	5	6	7	8	9
24. Energetic	1	2	3	4	5	6	7	8	9
25. Envious	1	2	3	4	5	6	7	8	9
26. Extraverted	1	2	3	4	5	6	7	8	9

27. Fearful	1	2	3	4	5	6	7	8	9
28. Fretful	1	2	3	4	5	6	7	8	9
29. Generous	1	2	3	4	5	6	7	8	9
30. Haphazard	1	2	3	4	5	6	7	8	9
31. Harsh	1	2	3	4	5	6	7	8	9
32. Helpful	1	2	3	4	5	6	7	8	9
33. High-strung	1	2	3	4	5	6	7	8	9
34. Imaginative	1	2	3	4	5	6	7	8	9
35. Imperceptive	1	2	3	4	5	6	7	8	9
36. Imperturbable	1	2	3	4	5	6	7	8	9
37. Impractical	1	2	3	4	5	6	7	8	9
38. Inconsistent	1	2	3	4	5	6	7	8	9
39. Inefficient	1	2	3	4	5	6	7	8	9
40. Inhibited	1	2	3	4	5	6	7	8	9
41. Innovative	1	2	3	4	5	6	7	8	9
42. Insecure	1	2	3	4	5	6	7	8	9
43. Intellectual	1	2	3	4	5	6	7	8	9
44. Introspective	1	2	3	4	5	6	7	8	9
45. Introverted	1	2	3	4	5	6	7	8	9
46. Irritable	1	2	3	4	5	6	7	8	9
47. Jealous	1	2	3	4	5	6	7	8	9
48. Kind	1	2	3	4	5	6	7	8	9
49. Moody	1	2	3	4	5	6	7	8	9
50. Neat	1	2	3	4	5	6	7	8	9
51. Negligent	1	2	3	4	5	6	7	8	9
52. Nervous	1	2	3	4	5	6	7	8	9
53. Organized	1	2	3	4	5	6	7	8	9
54. Philosophical	1	2	3	4	5	6	7	8	9
55. Pleasant	1	2	3	4	5	6	7	8	9
56. Practical	1	2	3	4	5	6	7	8	9
57. Prompt	1	2	3	4	5	6	7	8	9
58. Quiet	1	2	3	4	5	6	7	8	9
59. Relaxed	1	2	3	4	5	6	7	8	9
60. Reserved	1	2	3	4	5	6	7	8	9
61. Rude	1	2	3	4	5	6	7	8	9
62. Self-pitying	1	2	3	4	5	6	7	8	9
63. Selfish	1	2	3	4	5	6	7	8	9
64. Shallow	1	2	3	4	5	6	7	8	9
65. Shy	1	2	3	4	5	6	7	8	9
66. Simple	1	2	3	4	5	6	7	8	9
67. Sloppy	1	2	3	4	5	6	7	8	9
68. Steady	1	2	3	4	5	6	7	8	9
69. Sympathetic	1	2	3	4	5	6	7	8	9
70. Systematic	1	2	3	4	5	6	7	8	9
71. Talkative	1	2	3	4	5	6	7	8	9

72. Temperamental	1	2	3	4	5	6	7	8	9
73. Thorough	1	2	3	4	5	6	7	8	9
74. Timid	1	2	3	4	5	6	7	8	9
75. Touchy	1	2	3	4	5	6	7	8	9
76. Trustful	1	2	3	4	5	6	7	8	9
77. Unadventurous	1	2	3	4	5	6	7	8	9
78. Uncharitable	1	2	3	4	5	6	7	8	9
79. Uncooperative	1	2	3	4	5	6	7	8	9
80. Uncreative	1	2	3	4	5	6	7	8	9
81. Undemanding	1	2	3	4	5	6	7	8	9
82. Undependable	1	2	3	4	5	6	7	8	9
83. Unemotional	1	2	3	4	5	6	7	8	9
84. Unenvious	1	2	3	4	5	6	7	8	9
85. Unexcitable	1	2	3	4	5	6	7	8	9
86. Unimaginative	1	2	3	4	5	6	7	8	9
87. Uninquisitive	1	2	3	4	5	6	7	8	9
88. Unintellectual	1	2	3	4	5	6	7	8	9
89. Unintelligent	1	2	3	4	5	6	7	8	9
90. Unkind	1	2	3	4	5	6	7	8	9
91. Unreflective	1	2	3	4	5	6	7	8	9
92. Unrestrained	1	2	3	4	5	6	7	8	9
93. Unsophisticated	1	2	3	4	5	6	7	8	9
94. Unsympathetic	1	2	3	4	5	6	7	8	9
95. Unsystematic	1	2	3	4	5	6	7	8	9
96. Untalkative	1	2	3	4	5	6	7	8	9
97. Verbal	1	2	3	4	5	6	7	8	9
98. Vigorous	1	2	3	4	5	6	7	8	9
99. Warm	1	2	3	4	5	6	7	8	9
100. Withdrawn	1	2	3	4	5	6	7	8	9

5. Listed below are a number of statements concerning personal attitudes and traits. Read each item and indicate whether it is true or false as it pertains to you personally.

Please circle your response.

1. Before voting, I thoroughly investigate the qualifications of all the candidates.	**TRUE**	**FALSE**
2. I never hesitate to go out of my way to help someone in trouble.	**TRUE**	**FALSE**
3. It is sometimes hard for me to go on with my work if I am not encouraged.	**TRUE**	**FALSE**
4. I have never intensely disliked someone.	**TRUE**	**FALSE**
5. On occasion I have doubts about my ability to succeed in life.	**TRUE**	**FALSE**
6. I sometimes feel resentful when I don't get my way.	**TRUE**	**FALSE**
7. I am always careful about my manner of dress.	**TRUE**	**FALSE**

8. My table manners at home are as good as when I eat out at a restaurant.	**TRUE**	**FALSE**
9. If I could get into a movie without paying and be sure I was not seen I would probably do it.	**TRUE**	**FALSE**
10. On a few occasions, I have given up doing something because I thought too little of my ability.	**TRUE**	**FALSE**
11. I like to gossip at times.	**TRUE**	**FALSE**
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.	**TRUE**	**FALSE**
13. No matter who I'm talking to, I'm always a good listener.	**TRUE**	**FALSE**
14. I can remember 'playing sick' to get out of something.	**TRUE**	**FALSE**
15. There have been occasions when I took advantage of someone.	**TRUE**	**FALSE**
16. I'm always willing to admit when I make a mistake.	**TRUE**	**FALSE**
17. I always try to practice what I preach.	**TRUE**	**FALSE**
18. I don't find it particularly difficult to get along with loudmouthed, obnoxious people.	**TRUE**	**FALSE**
19. I sometimes try to get even rather than forgive and forget.	**TRUE**	**FALSE**
20. When I don't know something, I don't at all mind admitting it.	**TRUE**	**FALSE**
21. I am always courteous, even to people who are disagreeable.	**TRUE**	**FALSE**
22. At times I have really insisted on having things my own way.	**TRUE**	**FALSE**
23. There have been occasions when I felt like smashing things.	**TRUE**	**FALSE**
24. I would never think of letting someone else be punished for my wrongdoings.	**TRUE**	**FALSE**
25. I never resent being asked to return a favour.	**TRUE**	**FALSE**
26. I have never been angered when people expressed ideas very different from my own.	**TRUE**	**FALSE**
27. I never made a long trip without checking the safety of my car.	**TRUE**	**FALSE**
28. There have been times when I was quite jealous of the good fortune of others.	**TRUE**	**FALSE**
29. I have almost never felt the urge to tell someone off.	**TRUE**	**FALSE**
30. I am sometimes irritated by people who ask favours of me.	**TRUE**	**FALSE**
31. I have never felt that I was punished without cause.	**TRUE**	**FALSE**
32. I sometimes think when people have a misfortune they only got what they deserved.	**TRUE**	**FALSE**
33. I have never deliberately said something that hurt someone's feelings.	**TRUE**	**FALSE**

5. To what extent do religious beliefs affect your beliefs about sexual behaviour?

1 2 3 4 5 6 7

Not at all Extremely

6. To what extent do religious beliefs affect your current and past sexual behaviours?

1 2 3 4 5 6 7

Not at all Extremely

Appendix I

Proceptive and Receptive Mating Strategy Scale (PARMSS-I)

Classroom Scene

1. Your life is exactly as it is right now. Imagine it is Friday, and you have been assigned to work in pairs for a class project. Imagine that you have been assigned an attractive man to be your partner. You spend several hours together in the library working on the project. You find yourself very interested in him. How likely are you to:

	1 Not at all Likely				5 Neutral				9 Extremely Likely
a. Give him your phone number if he asked for it?	1	2	3	4	5	6	7	8	9
b. Ask him for his phone number?	1	2	3	4	5	6	7	8	9
c. Smile and make lots of eye contact with him?	1	2	3	4	5	6	7	8	9
d. Return his smile and eye contact?	1	2	3	4	5	6	7	8	9
e. Ask him for a ride home?	1	2	3	4	5	6	7	8	9
f. Accept a ride home from him if he offered?	1	2	3	4	5	6	7	8	9

Nightclub Scene

2. That night, you two both happen to be at the same club. You've heard from a mutual friend that he's interested in you. At the club, how likely would you be to:

	1 Not at all Likely				5 Neutral				9 Extremely Likely
a. Return his eye contact from across the room?	1	2	3	4	5	6	7	8	9
b. Make eye contact with him from across the room?	1	2	3	4	5	6	7	8	9
c. Return his smile from across the room?	1	2	3	4	5	6	7	8	9
d. Smile at him from across the room?	1	2	3	4	5	6	7	8	9
e. Dance with him if he asked you to?	1	2	3	4	5	6	7	8	9
f. Ask him to dance?	1	2	3	4	5	6	7	8	9
g. Allow him to buy you a drink?	1	2	3	4	5	6	7	8	9
h. Buy him a drink?	1	2	3	4	5	6	7	8	9
i. Allow him to kiss you, if he initiated?	1	2	3	4	5	6	7	8	9
j. Kiss him, if you initiated?	1	2	3	4	5	6	7	8	9
k. Accept an offer for a ride home from him?	1	2	3	4	5	6	7	8	9
l. Ask him for a ride home?	1	2	3	4	5	6	7	8	9
m. Have an uncommitted sexual relationship (one night stand) with him, if he initiated it?	1	2	3	4	5	6	7	8	9

n. Initiate having an uncommitted sexual relationship (one night stand) with him?	1	2	3	4	5	6	7	8	9

Vacation Scene

Your life is exactly as it is right now. Imagine that you are on a vacation by yourself to a city far away. You meet a man on a tour of the city that you are visiting and throughout the day-long tour, you have spent much of the time talking with him and you really enjoy being with him. At the end of the day, you two decide to have dinner together. After dinner, you two decide to go back to one of your hotels. He lives very far away from you, so a long-term relationship is out of the question. However, you know that he is very interested in having a short-term relationship with you while you are both on vacation. If you knew that no one would ever find out, how likely would you be to:

	1 Not at all Likely				5 Neutral				9 Extremely Likely
a. Hold hands with him, if he initiated?	1	2	3	4	5	6	7	8	9
b. Initiate holding hands with him?	1	2	3	4	5	6	7	8	9
c. 'Make out' with him (without the removal of any clothes) if he initiated?	1	2	3	4	5	6	7	8	9
d. Initiate 'making out' with him (without the removal of any clothes)?	1	2	3	4	5	6	7	8	9
e. Would you agree to have oral sex with him, if he brought it up?	1	2	3	4	5	6	7	8	9
f. Would you initiate oral sex?	1	2	3	4	5	6	7	8	9
g. Have vaginal sex with him, if he initiated?	1	2	3	4	5	6	7	8	9
h. Initiate having vaginal sex with him?	1	2	3	4	5	6	7	8	9

If it were possible to have a long-term relationship with this man, would you be interested?

Yes			Maybe			No
1	2	3	4	5	6	7

Proceptive and Receptive Mating Strategy Scale (PARMSS-P)

Classroom Scene

1. Your life is exactly as it is right now. Imagine it is Friday, and you have been assigned to work in pairs for a class project. Imagine that you have been assigned **this** man to be your partner. You spend several hours together in the library working on the project. You find yourself very interested in him. How likely are you to:

	1 Not at all Likely				5 Neutral				9 Extremely Likely
g. Give him your phone number if he asked for it?	1	2	3	4	5	6	7	8	9
h. Ask him for his phone number?	1	2	3	4	5	6	7	8	9
i. Smile and make lots of eye contact with him?	1	2	3	4	5	6	7	8	9
j. Return his smile and eye contact?	1	2	3	4	5	6	7	8	9
k. Ask him for a ride home?	1	2	3	4	5	6	7	8	9
l. Accept a ride home from him if he offered?	1	2	3	4	5	6	7	8	9

Nightclub Scene

2. That night, you two both happen to be at the same club. You've heard from a mutual friend that he's interested in you. At the club, how likely would you be to:

	1 Not at all Likely				5 Neutral				9 Extremely Likely
f. Return his eye contact from across the room?	1	2	3	4	5	6	7	8	9
g. Make eye contact with him from across the room?	1	2	3	4	5	6	7	8	9
h. Return his smile from across the room?	1	2	3	4	5	6	7	8	9
i. Smile at him from across the room?	1	2	3	4	5	6	7	8	9
j. Dance with him if he asked you to?	1	2	3	4	5	6	7	8	9
f. Ask him to dance?	1	2	3	4	5	6	7	8	9
g. Allow him to buy you a drink?	1	2	3	4	5	6	7	8	9
h. Buy him a drink?	1	2	3	4	5	6	7	8	9
i. Allow him to kiss you, if he initiated?	1	2	3	4	5	6	7	8	9
j. Kiss him, if you initiated?	1	2	3	4	5	6	7	8	9
k. Accept an offer for a ride home from him?	1	2	3	4	5	6	7	8	9
l. Ask him for a ride home?	1	2	3	4	5	6	7	8	9
m. Have an uncommitted sexual relationship (one night stand) with him, if he initiated it?	1	2	3	4	5	6	7	8	9
n. Initiate having an uncommitted sexual relationship	1	2	3	4	5	6	7	8	9

(one night stand) with him?									

Vacation Scene

Your life is exactly as it is right now. Imagine that you are on a vacation by yourself to a city far away. You meet **this** man on a tour of the city that you are visiting, and throughout the day-long tour, you have spent much of the time talking with him and you really enjoy being with him. At the end of the day, you two decide to have dinner together. After dinner, you two decide to go back to one of your hotels. He lives very far away from you, so a long-term relationship is out of the question. However, you know that he is very interested in having a short-term relationship with you while you are both on vacation. If you knew that no one would ever find out, how likely would you be to:

	1 Not at all Likely			5 Neutral			9 Extremely Likely		
i. Hold hands with him, if he initiated?	1	2	3	4	5	6	7	8	9
j. Initiate holding hands with him?	1	2	3	4	5	6	7	8	9
k. 'Make out' with him (without the removal of any clothes) if he initiated?	1	2	3	4	5	6	7	8	9
l. Initiate 'making out' with him (without the removal of any clothes)?	1	2	3	4	5	6	7	8	9
m. Would you agree to have oral sex with him, if he brought it up?	1	2	3	4	5	6	7	8	9
n. Would you initiate oral sex?	1	2	3	4	5	6	7	8	9
o. Have vaginal sex with him, if he initiated?	1	2	3	4	5	6	7	8	9
p. Initiate having vaginal sex with him?	1	2	3	4	5	6	7	8	9

If it were possible to have a long-term relationship with this man, would you be interested?

Yes			Maybe			No
1	2	3	4	5	6	7

Do you recognize this man? Please circle:

YES **NO**

Appendix J

Recruitment Scripts

Script for Recruiting Participants from Psychology Courses in Person

"Hello, I'm Maggie Phillips, and Dr. Oinonen and I are conducting a study on person perceptions, and dating attitudes and behaviours. I am looking for women 18 years and older. The study involves coming to the lab to pick up the study material, and then coming to the lab two times for about one hour each session. You will fill in questionnaires and rate photos of male faces on a number of different traits. Participants in the study can receive up to three bonus points for participation."

Email to Psychology Students

Dear students,
You are invited to participate in a psychology study looking at women's personality and person perception. Potential participants are *women 18 years or older.*

This study involves coming to the lab for an initial meeting (about 5 minutes). There will then be two laboratory sessions, each lasting about one hour. During these sessions, you will complete questionnaire and rate pictures of male faces. You will also be asked to monitor your hormone levels for about two-five days (which takes about 5 minutes a day).

Attached is more information about the study, as well as a screening questionnaire. Please print the screening questionnaire, complete it, and return it to the box in SN1002A (the psychology main office). Eligible participants will be contacted via email to participate.

We sincerely appreciate your participation.

Maggie Phillips, MSc and Dr. Kirsten Oinonen
Department of Psychology
Lakehead University

Communication Bulletin

Researchers in the department of psychology are looking for women 18 years or older to participate in a study examining women's personality and person perceptions. Participation involves hormone detection, completing questionnaires, and rating pictures of male faces. Please email mphillip@lakeheadu.ca to find out more.

Appendix K

Poster/Multi-Media Advertisement for Recruiting Participants

RESEARCH STUDY:
Women's Personality and Person Perception

Maggie Phillips, Dr. Kirsten Oinonen, and Dr. Dwight Mazmanian in the Department of Psychology at Lakehead University are looking for women to participate in a study on personality and person perception. This study has received ethical approval by Lakehead University's Research Ethics Board.

Eligible participants:

- **Women 18 years or older**

Participation in this study involves attending two appointments, each lasting approximately 1 hour. Each session will involve completing a questionnaire and rating pictures of male faces.

This is an excellent opportunity to learn about the scientific research process while contributing to research.

For more information and details on how to participate:
email: **mphillip@lakeheadu.ca** or phone: **472-5474**

Person perception Study
mphillip@lakeheadu.ca
472-5474

Person perception Study
mphillip@lakeheadu.ca
472-5474
Person perception Study
mphillip@lakeheadu.ca
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Appendix L

Screening Letter to the Participant

Title of study: Person perception and dating behaviour in women

Dear Potential Participant,

This study is being conducted by Ms. Maggie Phillips, Dr. Kirsten Oinonen, and Dr. Dwight Mazmanian of the Department of Psychology at Lakehead University. The purpose of the study is to examine person perception and dating behaviours in women. This screening questionnaire will be used to select participants for the next phase of the study. Individuals who are selected for the next phase of the study will be contacted within the next few weeks and will receive up to three bonus points towards their final grade in Psychology 1100.

Participation in the screening process will involve the completion of a short questionnaire that should take approximately 15 minutes. The questionnaire includes personal information about demographics, menstrual history, relationship information, and health and medical information. If selected to participate in the next phase of the study, we will ask you to come in to the laboratory on two separate occasions. Each session will last approximately 1 hour and you would be asked to complete questionnaires and person perception activities. You will also be asked to monitor your hormone levels using a urine kit provided to you by the researcher. This will take about five minutes a day, for up to five days. Psychology 1100 students will receive .5 research credits for completing the screening questionnaire, 1 credit for each laboratory session they attend, and .5 credits for attending both sessions (for a total of 3 bonus points).

Participation in this study is completely voluntary and you may withdraw at any time without penalty. You may decline to answer any of the questions in this survey. All records of your participation will be kept confidential and reports of the study will not reveal you as a participant. As per university requirements, all data will be stored for at least five years by Dr. Oinonen at Lakehead University and remain confidential and anonymous. Individuals who meet specific criteria will be asked to participate in the second phase of the study. For this reason we are asking for your name and contact information. Once individuals suitable for the second phase of the study have been identified, these forms will be removed from the questionnaire and your information will remain anonymous and confidential. Your name and contact information will be in no way connected to your questionnaire responses. There are no known physical or psychological risks involved in participating in this study. Participating in this study will provide valuable data on women's person perceptions and dating behaviours. This study was approved by the Lakehead Univesity Research Ethics Board on (766-7289). **Please keep this letter for your own records.**

K. Oinonen, Ph.D., C. Psych.
Associate Professor
Dept. of Psychology

Maggie Phillips, M.Sc.
Doctoral Candidate
Dept. of Psychology

D. Mazmainan, Ph. D., C. Psych
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Appendix M

Screening Consent Form

Title of study: Person perception and dating behaviour in women

I have read and understood the above information in the Letter to the Potential Participant. I understand the potential risks and benefits of this study. I am free to decline to answer any particular questions, and I may completely withdraw from the study at any point without penalty. As per university requirements, the anonymous data that I provide will be kept in a secure room for five years. Any reports of this data will be in aggregate form and will not identify me personally as a participant.

I agree to participate in this study under these conditions.

Name (please print): _____
Student Number: _____
Psychology 1100 Professor (if applicable): _____
Phone Number: _____
Primary Email Address: _____
Preferred method of contact [ ] Phone [ ] Email
Signed: _____
Date(year/month/day):____/____/____

Appendix N

Screening Debriefing Form

Thank you for participating in the screening phase of our study. You will be awarded 0.5 bonus points towards your final Introductory Psychology mark (if applicable). If you are selected to participate further in the study you will be contacted by a research assistant in the next few weeks. Participants in the next phases of the study will receive up to 2.5 more bonus points towards their final grade in psychology 1100 upon completion of the next two testing phases (one point per session, and an extra 0.5 if both are completed).

Please be assured that once participants have been selected for the study, the consent forms will be removed from the screening questionnaires and there will be no way to identify your responses. All of your responses will be coded to conceal your identity on the questionnaires and all data will remain anonymous. This research project was approved by the Lakehead University Research Ethics Board (766-7289). If you have any questions please feel free to contact Dr. Kirsten Oinonen of the Department of Psychology. **Please keep this form for your own records.**

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Appendix O

Laboratory Letter to the Participant

Title of study: Person perception and dating behaviour in women

Dear Potential Participant,

You are invited to take part in a study being conducted by Ms. Maggie Phillips, Dr. Kirsten Oinonen, and Dr. Dwight Mazmanian of the department of Psychology at Lakehead University. The purpose of the study is to examine person perception and dating behaviour in women.

This study consists of two sessions which will take place at Lakehead University. The sessions will involve completing a few picture-rating tasks of male faces and some questionnaires. The written questionnaire will include personal questions on demographics, relationship history, sexuality, and health. Sessions will last approximately 1 hour. Session times and meeting places will be set up by the examiner ahead of time. Time between sessions will range from 1 to 6 weeks. Participants will also be asked to monitor their hormone levels using a kit provided by the researcher. This involves testing your urine once a day for up to five days.

Psychology 1100 students will receive one bonus marks toward their final grade upon completion of each session and an additional 0.5 bonus points for completing both sessions. You have already been awarded 0.5 bonus points for completing the screening questionnaire.

Participation in this study is completely voluntary and you may withdraw at any time without penalty. Some of the questions in this survey are quite sensitive and personal. All of your responses will be kept strictly confidential. Your responses are anonymous, and there will be no way of connecting your name with your survey. If you feel uncomfortable answering any question, please skip that question and move on to the next. All reports of the study will be in aggregate form; no report will reveal you as a participant.

As per university requirements, all data will be stored for at least five years by Dr. Oinonen at Lakehead University and remain confidential and anonymous. Your name and contact information will be in no way connected to your questionnaire responses. No one will have access to this anonymous data except Dr. Kirsten Oinonen and students working directly under her supervision. There are no known physical risks involved in participating in this study. Some questions are quite sensitive and personal, and you may feel any number of feelings when responding to them. If at any time you feel overwhelmed or do not want to continue, please advise the researcher that you no longer wish to participate, and you will be withdrawn from the study without penalty. Counselling services are available through the Student Health and Counselling Centre (343-8361), should you require such service. Your participation in this study will provide valuable information regarding how women perceive men, and what factors women consider important in a partner.

Any questions or concerns you may have about the study should be directed to Dr. Oinonen (343-8096). This study was approved by the Lakehead University Research Ethics Board (766-7289). **Please keep this letter for your own personal reference**.

Appendix P

Laboratory Consent Form

Title of study: Person perception and dating behaviour in women

I have read and understood the above information in the Letter to the Potential Participant. I understand the potential risks and benefits of this study. I understand that some of the items in the questionnaires are of a sensitive and private nature, and that I may feel uncomfortable answering them. I am free to decline to answer any particular questions, and I may completely withdraw from the study at any point without penalty. As per university requirements, the anonymous data that I provide will be kept in a locked laboratory for at least five years. If I have indicated so above, a summary of the results will be provided to me upon completion of the study. Any reports of this data will be in aggregate form and will not identify me personally as a participant.

I agree to participate in this study under these conditions.

Name (please print): _____

Signed: _____

Date (year/month/day): ____/____/____

Student number (For bonus points): _____

Psychology instructor (For bonus points):_____

If you are interested in receiving a summary of the study findings when the study is completed, please provide your email address:

Email: _____

_____

Appendix Q

Laboratory Debriefing Form

Thank you for participating in our study. The data you have contributed will be used to investigate the effects of hormones on person perceptions and dating attitudes and behaviours in women. Research has previously shown that women's hormone levels affect how attracted they are to men. This study was designed to investigate whether or not certain personality characteristics could influence that relationship.

This research project has been approved by the Lakehead University Research Ethics Board (766-7289). All of your responses will be coded to conceal your identity on the questionnaires and all data will remain anonymous. If you have previously indicated that you would like to receive a summary of the study results, they will be emailed to you upon completion of the study.

If you are a Psychology 1100 student, your professor will be notified about how many bonus points you have received.

If you would like further information about how hormones affect women's person perception and dating behaviour, please refer to the references listed below. Also, if you have any concerns or questions about the study, please feel free to contact Ms. Phillips or Dr. Oinonen.

Gangestad, S. W., Garver-Apgar, C. E., Simpson, J. A., & Cousins, A. J. (2007). Changes in women's mate preferences across the ovulatory cycle. *Journal of Personality and Social Psychology, 92*, 151 – 163.

Macrae, C. N., Alnwick, K. A., Milne, A. B., Schloeerscheidt, A. M. (2002). Person perception across the menstrual cycle: Hormonal influences on social-cognitive functioning. *Psychological Science, 13*, 532 – 536.

Regan, P. C. (1996). Rhythms of desire: The association between menstrual cycle phases and female sexual desire. *Canadian Journal of Human Sexuality, 5*, 145 – 156.

Rose, S., & Frieze, I. H. (1989). Young singles' scripts for a first date. *Gender and Society, 3*, 258 – 268.

Weeden, J., & Sabini, J. (2007). Subjective and objective measures of attractiveness and their relation to sexual behaviour and sexual attitudes in university students. *Archives of Sexual Behaviour, 36*, 79 – 88

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Appendix R

Picture-Rating Task: Face Attributes

Based on appearance alone, please indicate the extent to which you think that each man exhibits the following characteristics:

	1 Not at all								9 Extremely
1. Sexiness	1	2	3	4	5	6	7	8	9
2. Kindness and understanding	1	2	3	4	5	6	7	8	9
3. Faithfulness and loyalty	1	2	3	4	5	6	7	8	9
4. Stable personality	1	2	3	4	5	6	7	8	9
5. Responsibility	1	2	3	4	5	6	7	8	9
6. Sense of humour	1	2	3	4	5	6	7	8	9
7. Similar values and beliefs	1	2	3	4	5	6	7	8	9
8. Qualities of a good parent	1	2	3	4	5	6	7	8	9
9. Sex appeal	1	2	3	4	5	6	7	8	9
10. Physical attractiveness	1	2	3	4	5	6	7	8	9
11. Social status	1	2	3	4	5	6	7	8	9
12. Financial resources	1	2	3	4	5	6	7	8	9
13. Fun and exciting personality	1	2	3	4	5	6	7	8	9
14. Desire for children	1	2	3	4	5	6	7	8	9
15. Quality of health	1	2	3	4	5	6	7	8	9
16. Intelligence	1	2	3	4	5	6	7	8	9
17. Healthy	1	2	3	4	5	6	7	8	9
18. Attractiveness	1	2	3	4	5	6	7	8	9

Appendix S

Instructions for Use of Hormone Detection Strips

Instructions for Participants who will be Scheduled upon a Positive Test

* Begin using the hormone strips on _____.

Please follow these instructions:

- Testing should occur between 2pm and 8pm.
- Please test at the same time every day (so before beginning to test, think about what time of day would be the best for you in terms of being able to consistently test at the same time every day).
- Restrict your fluid intake for about 2 hours before you test your urine. Diluted urine makes it harder to detect hormones.
- You will be doing this test **once a day** for about five days
- If you run out of strips before you see two lines, please contact the experimenter and more strips will be provided to you (preferably giving the experimenter enough notice to allow us to get you some more strips without missing a day of testing).
- Keep the unused strips away from moisture and direct sunlight

Step 1

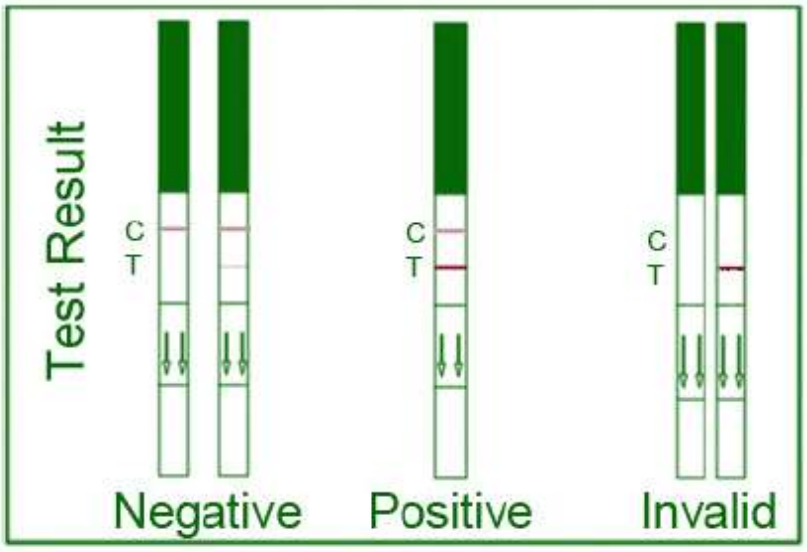
Collect urine in one of the paper cups provided. Open the strip package only when ready to use.

Step 2

Immerse the strip in the urine, with the arrow pointing down towards the urine. Do not immerse past the MAX line. Take the strip out after 5 seconds and lay the strip flat on a clean, dry, non-absorbent surface (it might be easiest to lay the strip across the mouth of the paper cup provided). Do not immerse for longer than 7 seconds.

Step 3

Wait for coloured bands to appear (40 seconds to 10 minutes). Either one band or two bands will appear. If you get an invalid test result, please try another test strip.



Step 4

Once a test result shows 2 coloured bands (a positive test result), please contact the experimenter as soon as possible that day (Maggie Phillips 472-5474, or datingstudy@lakeheadu.ca). An appointment for your next session will be made. This appointment must be within 48 hours of the bands appearing on the strip.

Thank you for your participation. If you have any questions or concerns, please contact the experimenter at the phone number or e-mail address listed above.

Instructions for Participants who have a Laboratory Session Appointment Booked

* Begin using the hormone strips on _____.

Please follow these instructions:

- Testing should not occur in the morning. Best results will occur after 2 p.m.
- Please test at the same time every day (so before beginning to test, think about what time of day would be the best for you in terms of being able to consistently test at the same time every day).
- If you run out of strips before you see two lines, please contact the experimenter and more strips will be provided to you (preferably giving the experimenter enough notice to allow us to get you some more strips without missing a day of testing).
- You will be doing this test **once a day** for about five days

- Keep the unused strips away from moisture and direct sunlight.
- If you have not had a positive test result before your scheduled laboratory appointment, come to the appointment anyways, and continue testing every day until you obtain a positive test result. Email the researcher when you do get a positive test result.

Step 1

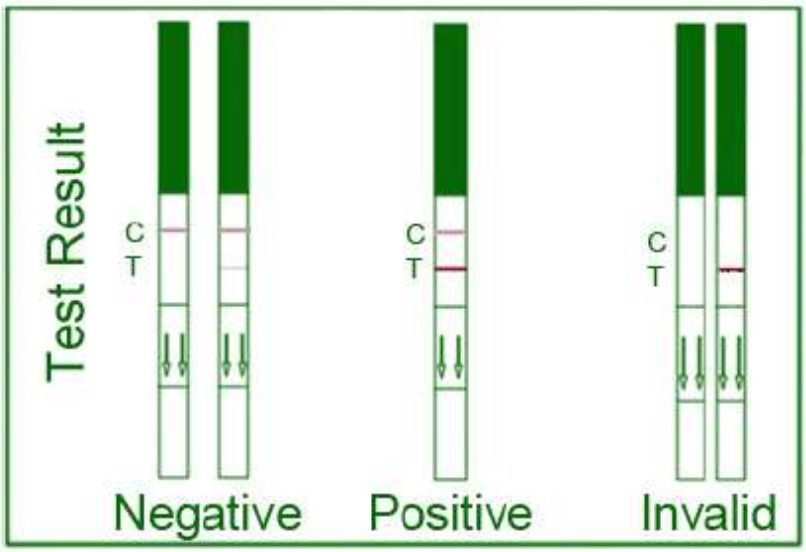
Collect urine in one of the paper cups provided. Open the strip package only when ready to use.

Step 2

Immerse the strip in the urine, with the arrow pointing down towards the urine. Do not immerse past the MAX line. Take the strip out after 5 seconds and lay the strip flat on a clean, dry, non-absorbent surface (it might be easiest to lay the strip across the mouth of the paper cup provided). Do not immerse for longer than 7 seconds.

Step 3

Wait for coloured bands to appear (40 seconds to 10 minutes). Either one band or two bands will appear. If you get an invalid test result, please try another test strip.



Step 4

Once a test result shows 2 coloured bands (a positive test result), please contact the researcher (Maggie Phillips 472-5474, or datingstudy@lakeheadu.ca) as soon as possible stating the day/time that you got a positive test result. If the positive result occurs more than 48 hours before your scheduled laboratory appointment, your appointment for your

next session will need to be rescheduled. This appointment must be within 48 hours of the bands appearing on the strip.

Thank you for your participation. If you have any questions or concerns, please contact the experimenter at the phone number or e-mail address listed above.

Appendix T

Kit Instruction Chart for Determining Day to Begin LH Testing

Average length of menstrual cycle	Day of cycle to start LH testing
21	6
22	6
23	7
24	7
25	8
26	9
27	10
28	11
29	12
30	13
31	14
32	15
33	16
34	17
35	18
36	19
37	20
38	21